The CHEMICAL AGE

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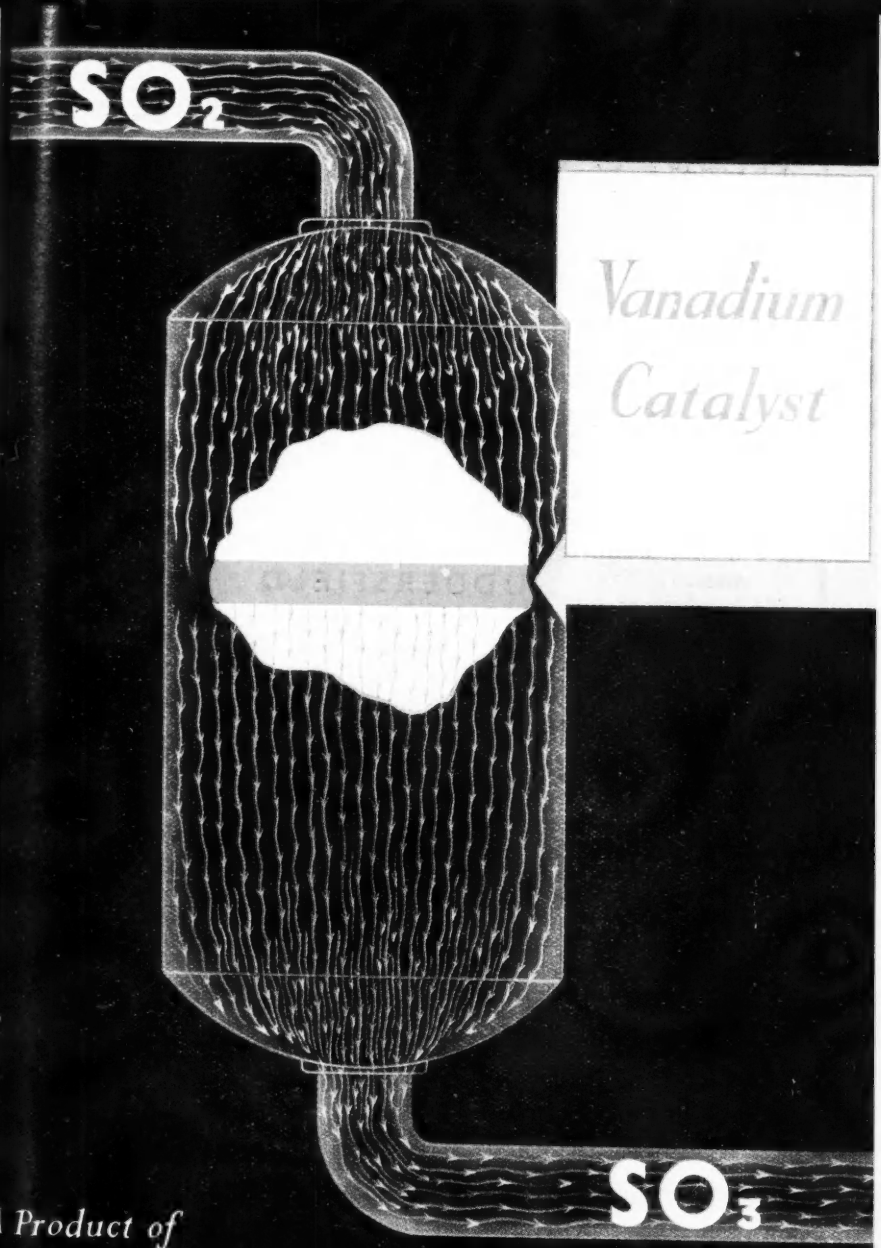

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Nationalisation—Gas and Chemicals

TAKING a first look at the Gas Bill a few weeks ago, we reflected that it brought the chemical industry very near to nationalisation. A better way of putting it would have been that it brought nationalisation very near to the chemical industry. While no important body of opinion has yet suggested nationalising the chemical industry, the application of that principle to the gas industry has brought some portions of chemical manufacture within its scope. Ammonia, benzol, parts of the tar distilling industry, the production of spent oxide and possibly other things, such as the working up of spent oxide into pure sulphur, will all come within the scope of a nationalised industry.

This field was studied at the recent meeting of the Institution of Gas Engineers in a paper presented by Messrs. C. Cooper and D. M. Henshaw, of W. J. Holmes & Co., Ltd., a firm which has specialised in the design of chemical plant for the gas and allied industries. These authors regard the scope of the gas industry in manufacturing existing products as being unduly circumscribed and they consider that the gas industry should go more deeply into the manufacture of pure products. "The total cost of handling and purification and the total cost of residuals other than coke (Is coke a residual?—Ed.), is no longer a large factor in determining the total cost of gas, and quite minor changes of practice in carbonisation, or even of distribution may have a greater financial influence on costs. Nevertheless, failure to market effectively the residuals whose removal cannot be avoided—the tar, ammonia and H_2S—and failure to deal effectively with the disposal of waste matters may have consequences apparently of much greater importance than appears at first sight. . . . The gas industry should not limit itself to the production of residuals that cannot very well be avoided. . . . The authors believe that the residuals should come into the chemical market as far as possible as pure products, rather than be marketed as produced, for what they will bring as partially purified products," This, if it is accepted by the new Gas Council, clearly foreshadows the extension of a nationalised industry into the chemical field.

A nationalised industry must of necessity do things on a large scale, and will generally do them in a way that is likely to involve a good deal of red tape. It is essential that the business of these great organisations should be conducted according to some kind of rule and that responsibility should be tied rather tightly in the hands of certain individuals or committees or departmental heads; otherwise affairs might soon get out of hand. The way to manage these affairs seems to have been well examined by certain large undertakings based on private enterprise: the Gas Light and Coke Company, Imperial Chemical Industries, and other large concerns seem to keep in the van of progress without destroying the initiative of the individual.

The authors of the paper under discussion take a poor view of the probability of individual opportunity under nationalisation.

On Other Pages

The likelihood of concentration of production in much larger units and the greatly increased cost of each such unit will in their view result in a marked decline in the number of opportunities for experiment on a working scale: "It may be agreed that in future experimental modifications will only be introduced as a result of organised research, which might more properly be considered as technical investigation, the openings for the early application of new discoveries will be fewer, and the discoverer will be proportionately handicapped in proving any points on the technical scale."

If this proves to be true, it will confirm the worst fears of the opponents of nationalisation. Many foresee that such great combines, besides being monopolistic in character, must move too slowly to keep in the van of progress. That is clearly the view of Mr. Cooper and Mr. Henshaw. If new developments cannot be put quickly into use, the industry responsible cannot retain its place in the modern world—except by virtue of a monopoly.

An interesting point made by Cooper and Henshaw is that one of the major difficulties in these new centralised gas-making plants is likely to be the disposal of effluent. We have not been backward in declaring here that the pollution of our watercourses and the despoilation of our once pleasant land by industrial effluents should be stopped forthwith. That formed the main theme of the presidential address to the Institution of Chemical Engineers, together with the parallel destruction of the landscape that seems too frequently to be the first-fruits of industrialisation. The cure would appear to be the more careful purification of effluent at the works. In the gasworks of the future we may see the recovery of phenols from spent liquor as an ancilliary process regarded as necessary as the removal of hydrogen sulphide from the gas.

In that connection, this paper goes to show that the gas industry may make increasing use of the chemist, and that will be so particularly in proportion as the engineering side of the industry becomes standardised. Research is foreshadowing many new processes but they seem to be just a little uncertain economically. There is nothing new in sight that seems at the moment likely to lead to cheaper gas than the present process of high temperature carbonisation-cum-water-gas.

De-requisitioning of Factories

The Ministry of Supply which, with the Ministry of Aircraft Production, had 33 million sq. ft. of factory space (2069 different establishments) under requisition in 1945, has now reduced property under its control to 2.7 million sq. ft. This figure represents 76 different units, of which 18 (area 356,000 sq. ft.) are being retained temporarily for essential work. The remaining 58 establishments will be released as soon as possible, and will in any case be released by December 10, 1952.

NOTES AND COMMENTS

" By Kind Permission "

A LITERAL example of the doctrine that we must export if we are to eat is suggested by the circumstances in which the annual dinner of the Association of British Chemical Manufacturers is being revived—at Grosvenor House, Park Lane, W.1, on October 13. Last year it was postponed, in accordance with the Government's wishes. This year the Ministry of Food has been pleased to sanction the consumption of something additional to what the ration book provides " in recognition of the important part played by the chemical industry in the export trade drive." It is not the intention of the powers that dispense or withhold authority to provide a meal of ceremonial proportions that the company shall make merry in forgetfulness of their export duties. The presence of the President of the Board of Trade, as guest of the evening, should be sufficient to ensure a suitable concentration on what the Government currently views as the first duty of the chemical industry, and others. Remembering what the industry has already contributed to the export drive—it trebled its 1938 cash total within a year of the end of the war—Mr. Harold Wilson may be persuaded to moderate his demands. He at least is not unaware of the special function of chemical industry as " universal supplier " of a host of other industries.

" Patent Medicine " Prejudice

IN the recent debates in the committee stage of the Finance (No. 2) Bill there has been overwhelming evidence of the affronts to equity and commonsense which seem to follow inevitably the imposition of discriminating taxation. They have served to bring into prominence the inequality of the burdens distributed on pharmaceutical products, so that the branded drugs and medicines are subject to 33⅓ per cent purchase tax while their unbranded counterparts go free. One of the worst features of this somewhat irrational pretence to distinguish sheep from goats among a host of reputable preparations, frequently identical in their composition, is the severe discouragement which the retention of a heavy tax is bound to give in an important section of export trade sustained by proprietary medicines. It is fairly certain that the production of some proprietary articles to compete in the home market on such unequal terms with non-branded equivalents will not be worth while. The drug houses have accordingly the alternatives of cutting production costs and profits by one-third to compete on equal terms or to produce only for export—neither of which is economically possible to most of them. The fact that among proprietary goods there are still what were described to the Parliamentary Committee as " ju-ju medicines " has evidently coloured the proceedings and facilitated the perpetuation of an injustice on the very large majority of the reputable. An attempt in the form of an amendment to extend the tax exemption to all drugs and medicines was defeated by 275 votes to 156.

The Steel Maze

THE literature which is produced for the Ministry of Supply does not generally consciously aspire to humour, yet that element certainly is apparent in a macabre form in the innocently titled " Notes for Consumers " in which the Ministry's Iron and Steel Board outlines the salient points of the monumental and appalling structure through which is administered the iron and steel distribution scheme and its pendant, the circular of January last concerning Form M and the I.S. Authorisations. The facts are expressed as lucidly as the complexity of the subject permits, yet the whole irresistibly suggests a guide book to some sort of devil's maze—which is in fact the maze in which steel users in a thousand categories, or those to whom steel in the form of plant or factory components is essential to continued or enlarged production, are to-day so desperately involved. There are four appendices in this HMSO booklet setting out the conditions in which different classes of steel products are permitted to be sold to various industries and sub-divisions of industries, and on whose authority. Having noted that eight pages in the type face in which the body of THE CHEMICAL AGE is printed are devoted to naming the authorising departments for different steel needs —more than 50 bureaux—the reader of

the HMSO booklet will not be deluded that the task of procuring steel for essential purposes is becoming any easier.

Still Dwindling

ONE of many who conspicuously are not afflicted with any delusion of that kind is Mr. M. A. T. Johnson, whose company, Richard Johnson and Nephew, Ltd., is among the largest users of steel—when they can get it. In his very incisive summary to shareholders of the imbroglio in which steel users are involved he recalled that in 1946 their output of steel wire was almost their lowest for 11 years; last year, notwithstanding a rise in steel production of several million tons above pre-war levels, their output was forced down a further 7000 tons. Given the steel, they could produce 30-40,000 tons more steel wire and similar products for which there is a ready demand at home and overseas. The prevailing steel distribution scheme, so far from relieving the inadequacy of their earlier quota, had in fact produced in April steel deliveries 1600 tons below what they were entitled to. In the circumstances, he revealed, Mr. Johnson will have found plenty of supporters of his condemnation of a steel administration which has permitted anomalies such as these, encouraged exports of semi-manufactured steel in a variety of categories, and starved many essential home industries. The fact that last month British steel was again produced at an annual rate exceeding 15.2 million tons will not mollify the resentment of those who cannot get it.

Aliases

ADMIRERS of the exactitude of scientific thought might well be perplexed by the apparent lack of precision when it comes to naming some of the physical processes. There are, in fact, almost as many "aliases" current in the literature of chemistry and chemical engineering as one might expect to find in the shadier social circles where some haziness about identities is more obviously desirable. That explanation, however, cannot be stretched to cover the case of "ultrasonics," which is better known in American chemical circles as "supersonics," a name which it bears with almost equal impartiality here. While only the pedant will deny that something briefer than "the use of acoustic waves of high frequency beyond the audible range of sound" is needed to describe a principle to which reference is increasingly being made as its widened uses in industry are recognised, many must experience the slight sense of uncertainty engendered by the Tolstoyan trick of alternating names. Said a physicist of the DSIR to whom we referred the problem this week: "There is a tendency among scientists to use 'ultrasonic' when referring to inaudible vibrations and 'supersonic' as an indication of the speed of a moving body, such as an aeroplane or projectile." He thought that some ruling would add clarity to the frequent references to "silent sound." That, unfortunately, is one of those rulings which are never made, there being no authority to issue them, other than the slow process of the law of usage. This is not an isolated example: equally perplexing is the quick-change propensities of another potent factor of comparatively recent occurrence in chemical affairs, the principle of radio frequency heating ("high frequency," "dielectric," "electronic" or "electrostatic" . . . according to taste.)

The New Cast Iron

"Most Notable Advance in Years"

THE development by British research workers of a new cast iron known as nodular graphite iron (THE CHEMICAL AGE, May 1 and June 5) has, according to Mr. J. G. Pearce, director of the Cast Iron Research Association, and Mr. Henton Morrough, the association's research manager, placed this country many years ahead of American experts in the same field. The two men have just returned from a visit to the U.S.A., where Mr. Morrough read a paper dealing with the new product to the American Foundrymen's Association congress at Philadelphia.

The Americans, said Mr. Morrough, considered the new iron provided the most notable metallurgical advance for many years and confessed that although their research laboratories had been working along similar lines they were well behind British developments.

"The Americans were surprised at our progress," Mr. Morrough recalled.

German Fertiliser Technology

Significant Advances Recorded

THE German firm, Kali-Chemie A.G., which developed the Rhenania process for the commercial production of a satisfactory phosphatic fertiliser by calcining rock phosphate with sodium salts and silica, has made significant improvements in the process since it was first used in 1917, according to a report on the German fertiliser industry recently completed by the United States Office of Technical Services investigators. (PB-81386, Manufacture of Phosphatic Fertiliser by the Rhenania Process.)

The available phosphorous pentoxide (P_2O_5) in the product has been increased from 12 to over 30 per cent, states the report and the fertiliser is thought to contain the phosphate chiefly in the form of dicalcium sodium phosphate which is practically insoluble in water but is easily available in neutral ammonium citrate.

Imported Materials

The material is produced by reacting finely ground phosphate rock, imported from North Africa, Curacao, and Russia, with soda ash and finely ground silica sand in rotary kilns at high temperatures. Important phases of the processes are the proportioning of the chemical constituents in the raw mix and the control of a rather difficult rotary kiln operation. Pulverised coal is used for fuel.

It is claimed, by the manufacturers, that heavy rains will not readily leach the fertiliser and the presence of moisture does not cause it to revert to less available phosphates. The company also states that extensive tests have shown that the phosphate can be successfully mixed with common nitrogenous and potassium fertilisers. The report adds that the Kali-Chemie plant at Brunsbuttelkoog is still operating, though on a reduced scale.

Copies of the report may be purchased for twenty-five cents each from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

Fertilisers Exported.—The fact that exports from the U.K. of nitrogenous fertilisers are regulated by the Food and Agriculture Organisation was recalled in the House of Commons this week by Mr. J. Belcher, replying to questions by Mr. De La Bère, who required to know why, in view of the acute shortage of fertilisers here, large quantities were being shipped to the Continent. Mr. Belcher claimed that ammonium nitrate of which most of the exports consisted was unsuitable for use here.

World Superphosphate Group

Annual Meeting in Brussels

THE International Superphosphate Manufacturers' Association held its annual series of meetings in Brussels recently, when some 200 delegates and members of their families were present, representing no less than 25 countries. Delegates were entertained by the Belgian Superphosphate Producers, the municipality of Brussels and Mr. van der Rest, vice-president of the Florida Hardrock Export Association.

In a speech at a banquet, given by the Belgian producers, the Belgian Minister of Agriculture, paid tribute to the efforts of the fertiliser industry in assisting world recovery.

The association has decided to increase its scientific work and to co-ordinate, as far as possible, experiments in connection with the use of superphosphate in its various member countries.

For the year 1948-49 the following officials were elected or re-elected: Mr. A. Waller (Holland), president, Messrs. R. Audouin (France), F. G. Clavering Fison (U.K.), H. Francke (Sweden), R. Standaert (Belgium), H. Stevenius-Nielsen (Denmark), R. M. Collin, secretary.

The association's membership now comprises manufacturers of superphosphate in 26 countries, and its honorary members include the principal producers of the raw materials for the industry throughout the world.

FERTILISERS FOR PORTUGAL

THE Portuguese Government is reported to be giving priority to the establishment of a fertiliser industry with modern equipment at a tentative cost of 500 million escudos. A plant, recently built at Esterreja by Amoniaco Portugues, is to be in operation within a few months. Output will total 25,000 tons of ammonium sulphate annually, and it is hoped to double this figure later on. Existing nitrate plants are being enlarged. Another ammonium sulphate factory is projected for Barreiro, also with an annual capacity of 25,000 tons.

The fertiliser projects form part of a large-scale programme of industrial development in Portugal, based upon three large hydro-electric schemes the benefit of which will be felt in 1950-51.

At Sao Joao de Madeira, a steel tube plant is being erected and in a suburb of Oporto, work is progressing on a tinplate factory.

Iranian Chemical Plan

Rôle in Industrial Development

THE establishment of large chemical factories in Iran, to meet demands expected to arise as the result of a seven-year programme of industrial development within the country, is foreshadowed in a report on the plan recently issued by a specially appointed Planning Board set up to investigate the findings of an American economic mission which visited Iran in 1946-7.

Chemicals and Oil

Within the seven years and at a cost of rial 75 million plus $8 million from exchange sources, the Iranian Government proposes to set up a sulphuric acid factory with an output of 45,000 tons a year; a sodium carbonate and bicarbonate factory producing 14,000 tons per year; ammonia and ammonia fertiliser factories with a capacity of 15,000 tons yearly; and several tanning factories having a combined annual output of 10,000 tons.

It is also proposed to form an oil company in Iran to prospect for oil in all areas not covered by an existing concession. The directors of the company would be exclusively Iranian but technical staff and specialists would be drawn from foreign sources.

Controlled Industrial Expansion

The general findings of the American mission were that Iran's major efforts should be directed towards increased efficiency and output in agricultural production, and industry should develop slowly and naturally. The subsequent report of the planning committee endorses the main findings of the mission and recommends that the seven-year programme should be carried out at an estimated total cost equivalent to £160 million.

The Iranian Ministry of National Economy has already announced that it is interested in the purchase of chemical laboratory equipment and interested British manufacturers are invited to obtain specifications from the Chancery of the Iranian Embassy, 50 Kensington Court, London.

The "Flamemaster"

Resulting from arrangements made between Chance Brothers, Ltd., Birmingham, manufacturers of the "Flamemaster" hand torch, and W. Edwards & Co. (London), Ltd., the latter firm has been appointed sole U.K. export agents for this new instrument for the glassworker.

The London company has designed special compression equipment—known as the Edwards Type IV Compressor Unit—for use with burners of this type and for the production of vacuua (to 26 in. Hg.).

Patent Processes Offered

Steel, Oil and Aluminium

TWO patents covering the manufacture of linear superpolymers for rubber compounding and a method for producing ethyl alcohol, have been announced as available for licence or sale by the United States Patent Office, Washington, D.C. Licences to practise the inventions will be issued on a royalty-free, non-exclusive, non-transferable, revocable basis.

Patent No. 2429219, covers a process for making liner superpolyesters and relates to high molecular dihydric alcohol polyesters of dimeric, dibasic fat acids derived from heat-bodied vegetable oils containing a plurality of double bonds. These linear superpolymers are useful as base materials in the preparation of elastic compounds and serve as suitable general purpose substitutes for natural rubber. In addition, they can be combined with sulphur, carbon black, accelerators, activators, and other ingredients used in rubber compounding.

Patent No. 2431004, covers a method for producing ethyl alcohol wherein ethyl alcohol is obtained by fermentation of starch material. The process is carried out employing *Endomycopsis fibuliger*, or varieties of this organism, together with strongly fermentative yeasts. The Endomycopsis species act as starch-converting agents and the yeasts function to produce ethyl alcohol from the starch-conversion products. The fermentation is based upon the principle of symbosis involving the two types of organisms.

ELECTROCHEMICAL DE-RUSTING

A DE-RUSTING service by means of an electrochemical process is to be established at the Grosvenor Road (London) works of De-rustit, Ltd., a newly formed company whose partners include Modern Machine Tools (of which the chairman, Mr. H. Weston, is the originator of the process) and Dudley Foundry, Ltd. The system can be operated anywhere for de-rusting heavy equipment, or parts can be sent to the works. Albright & Wilson, Ltd., is setting up a permanent installation at its Widnes works where it will be operated under licence from De-rustit, Ltd.

Mr. A. A. Grahame-Chapman states that the process de-rusts any ferrous article without damage to its structure and without laborious mechanical handling. Evolved about three years ago, the system was first successfully operated at the Coventry works of Modern Machine Tools, Ltd.

Scientific Liaison

New Commonwealth Grouping in London

THE British Commonwealth of Nations Scientific Liaison Offices (London) have been opened on the third floor of Africa House, Kingsway, W.C.2. This is one of the measures to facilitate co-operation in the civil aspects of science within the Commonwealth decided on by the British Commonwealth Scientific Official Conference held in London in 1946.

For a number of years several of the Commonwealth countries have maintained scientific liaison offices in London and these together with the ones about to be established will now have their headquarters in Africa House. Each of these offices will continue to operate as in the past, retaining complete independence of action, but the convenience of occupying adjacent premises will facilitate co-operation between them on matters of common interest.

For ease of reference to the group of independent offices as a whole the title given above has been chosen, with the abbreviation BCSO (London) for common use.

The offices taking part in the scheme are the Scientific Liaison Offices of Australia, Canada, Central African Council, India, New Zealand, South Africa and the United Kingdom. Pakistan and the Commonwealth Agricultural Bureaux will be represented and the Overseas Liaison Division of the U.K. Department of Scientific and Industrial Research will work in Africa House.

In Washington the scientific liaison offices of the Commonwealth countries are associated under a similar scheme

CHEMISTRY RESEARCH BOARD

THE Lord President of the Council has appointed the following to be members (honorary appointments for four years) of the Chemistry Research Board of the Department of Scientific and Industrial Research: MR. A. L. BACHARACH, head of the Nutrition Unit, Glaxo Laboratories, Ltd.; PROF. H. J. EMELEUS, Prof. of Inorganic Chemistry, Cambridge University, and PROF. D. M. NEWITT, Prof. of Chemical Engineering, Imperial College.

A report of the board for the years 1938-1946 is to be published very shortly.

Back to Coal.—Because of the rising cost of oil, Fleetwood trawler owners who have oil-burning vessels on the stocks are considering redesigning them to burn coal. When the war ended oil cost 70s. a ton; the present price is 131s. 6d. a ton at the port of delivery.

Industrial Productivity

Panels and Terms of Reference Announced

AT question time in the House of Commons last week, Sir Stafford Cripps announced the membership and terms of reference of each of the four Panels of the Committee on Industrial Productivity.

Technology and Research

Membership of Panel 1 (Technology and Operational Research) consists of:

Sir Wm. Stannier, Mr. G. B. Blaker: Treasury (Economic Affairs); Mr. S. A. ff. Dakin (Board of Trade); Mr. J. Davidson Pratt (Association of British Chemical Manufacturers); Dr. C. Gordon (Board of Trade); Dr. H. Hollings (Gas Light & Coke Co.); Dr. P. Dunsheath (FBI); Mr. L. H. C. Tippett (British Cotton Industry Research Association); Professor Willis Jackson (London University); Mr. J. R. Womersley (National Physical Laboratory); Lieut.-General F. G. Wrisberg (Ministry of Supply); Mr. E. P. Harries (TUC; Mr. T. Williamson (TUC); and Prof. T. U. Mathew (Birmingham Universtiy).

Imports Substitution

Panel 2 deals with imports substitution, and its members are:

Prof. S. Zuckerman (chairman), Mr. F. H. Braybrook (Shell Petroleum Co.); Mr. F. A. Burchardt (Oxford Institute of Statistics; Mr. S. A. ff. Dakin (Board of Trade); Mr. C. G. Eastwood (Colonial Office); Dr. H. J. T. Ellingham (Royal Institute of Chemistry); Major F. A. Freeth (I.C.I., Ltd.); Dr. C. Gordon (Board of Trade); Mr. R. L. Hall (Economic Section, Cabinet Office); Dr. R. P. Linstead (Chemical Research Laboratory); Dr. J. L. Simonsen (Colonial Products Research Council); Mr. F. W. Smith (Central Economic Planning Staff; Prof. A. R. Todd (Cambridge University) and Dr. N. C. Wright (Ministry of Food).

The third panel, which will concern itself with the human factors in industry, has as its chairman Sir Geo. Schuster. Other members are:

Mr. G. B. Blaker: Treasury (Economic Affairs); Dr. C. B. Frisby (National Institute of Industrial Psychology); Mr. L. Moss (Social Survey); Mr. John Neill (FBI); Mr. E. M. Nicholson (Lord President's Office); Mr. J. Tanner (TUC); Mr. M. D. Tennant (Ministry of Labour & National Service); Brigadier A. Torrie (War Office); Dr. S. Wyatt (Medical Research Council); Mr. L. O. Russell (British Institute of Management), and Dr. A. T. M. Wilson (Tavistock Institute of Human Relations).

Technical Information

Under the chairmanship of Dr. A. King, Panel 4 will deal with technical information services. Its members are:

Dr. B. J. A. Bard (FBI); Prof. J. D. Bernal (London University); Mr. O. F. Brown (DSIR); Sir Alfred Egerton (Secretary, Royal Society); Mr. B. Fullman (Aslib); Mr. E. E. Haddon (Ministry of Supply); Dr. J. E. Holmstrom (I.C.I., Ltd.); Sir Herbert Howard (Imperial Agricultural Bureaux); Mr. B. G. Lane (Board of Trade); Mr. H. T. Pledge (Science Library); Dr. W. E. Pretty (Admiralty); Mr. H. D. B. Wood (Board of Trade).

The committee will review existing information services for distributing scientific and technical information, and consider what improvements can be made in the interest of industry.

Chemical Statistics

1400 Fewer Chemical Workers

WITH the exception of sulphuric acid and fertilisers, and to a lesser extent industrial alcohol, in most basic chemicals there was a tendency for consumption in March and April to remain steady or to drop slightly. Consumption of sulphuric acid, according to the May *Digest of Statistics*, at 135,000 tons in March, was 11,000 tons greater than in February. Production, 129,000 tons in April, compares with 135,000 tons in March.

Production in April of steel ingots and castings, 294,000 tons, compares favourably with the previous month (291,000) and with the same month a year ago (only 236,000), and reflects the continuing intensification of the production drive by the industry and to some extent the results of development projects undertaken despite uncertainty of the Government's intentions regarding nationalisation.

Employment in the chemical industry during March, totalling 242,000, marks the end—at least temporarily—of the successive monthly increases in employment totals which we have been usual for some months past. The decrease of 1400 workers which occurred during March, is mainly attributable to a falling off in the number of women workers, only 75,600 being regularly engaged compared with 77,200 in February. Recruitment of men continued fairly satisfactorily in March, however, and the total at the month end at 167,000 was an advance of 200 compared with February. Returns for basic materials are as follows:—

PRODUCTION AND USE IN MARCH AND APRIL

	March, 1948 Thousand Tons			March, 1947 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	129.0†	135.0	51.1†	109.5†	104.0	67.3†
Sulphur	—	21.4†	88.8†	—	19.1†	70.6†
Pyrites	—	20.6†	81.0†	—	14.8†	88.0†
Spent oxide	—	16.4†	167.0†	—	14.7†	142.4†
Molasses	8.9	20.4*	205.0	6.3	27.8*	149.2
Industrial alcohol (mil. bulk gal.)	1.36	2.61	6.98	1.75	1.96	1.78
Superphosphate	103.7	172.0	67.0	89.9	128.9	144.7
Compound fertilisers	185.4	297.1	76.8	119.3	173.2	206.2
Agricultural lime	—	313.9	—	—	148.9	—
Ammonia‡	—	6.33†	5.26	—	5.15†	3.25
Phosphate rock (agric.)	—	82.4	144.5	—	66.1	117.9
Phosphate rock (indus.)	—	8.45	34.1	—	4.98	34.7
Virgin aluminium	2.72	14.7	—	2.45	13.2	—
Magnesium	0.24	0.17	—	0.21	0.18	—
Virgin copper	—	29.6	97.5	—	28.9	87.2
Virgin zinc	—	18.8	34.4	—	17.4	37.7
Refined lead	—	17.6	39.0	—	19.5	15.1
Tin	—	2.46	14.6	—	2.55	18.8
Zinc concentrates	—	13.5	56.0	—	12.8	88.0
Steel ingots and castings (including alloys)‡	294†	—	—	236†	—	—
Rubber:						
Waste collected	0.01	0.72	12.1	0.10	2.01	88.9
Reclaimed	0.51	0.59	3.68	0.43	0.44	5.11
Natural	—	4.52	137.1	—	7.31	158.1
Synthetic	—	0.06	2.01	—	0.06	3.15

* Distilling only. † April. ‡ Weekly average.

Stonewalling

Soap Manufacturer v Sir Stafford Cripps

MR. Wootton-Davies, chairman and managing director of Peter Lunt & Co., Ltd., soap and candle manufacturers, Aintree, Liverpool, describes as a Gilbertian situation the position which has arisen from an application by his firm to import a new plant to produce soap mechanically. He says: "The plant represents an experiment which, if successful and applied to England, would save 250,000 tons of coal a year." A year ago his firm entered a contract to purchase the plant from the U.S.A.—the first plant of its kind in existence, for which $50,000 was needed. The Fuel Economy Department supported an application to spend the dollars, but nothing happened.

A personal letter was sent to Sir Stafford Cripps, who replied that, because of dollar shortage, the expenditure could not be sanctioned. Further, added the letter, it was not known whether this was the best plant in existence, or whether an equally efficient plant could not be obtained in this country. Information regarding any other equally efficient plant was sought from Sir Stafford Cripps, but neither interviews nor correspondence brought a reply.

The Board of Trade decided to grant permission for import of the plant "as a demonstration plant for the export trade." Simultaneously, came the cancellation of the permit to erect the necessary buildings for the plant. To-day—a year after negotiations opened—the plant is lying at the docks.

CHEMICAL TRADERS TAKE STOCK

New Factors Reviewed at 25th Anniversary

FRESH testimony to the essential rôle fulfilled by the widespread merchanting organisation in preserving the vigour and promoting expansion of all branches of chemical industry was paid at the annual meeting in London on Tuesday of the British Chemical and Dyestuffs Traders' Association, Ltd., and the subsequent luncheon at the Savoy Hotel at which the association's 25th anniversary was celebrated.

Evidence of the watchful attention which the association has been giving during the year to the possible effects upon the industry of such measures as the Industrial Organisation and Development Bill was afforded at the meeting by the annual report of the chairman, Mr. A. Nash.

A subject which was always in the forefront of their trading activities, he said, was the pressing need for greater exports, and the Chemical Traders' Export Group had put in a useful year's work in furnishing members with information and assistance in overcoming delays and difficulties. Merchants had contributed substantially to the expansion in the export of chemicals, drugs and tar products, and, in spite of currency difficulties, their enterprise was again rebuilding the valuable entrepot trade which contributed so largely to this country's invisible exports in pre-war years.

Controlled Supplies

However, much more could be achieved if there were greater freedom of opportunity in the matter of access to supplies. Many home producers recognised that the services of the merchant exporter were essential to the proper development of overseas markets, and increasing competition from foreign countries made it imperative for industry and the merchanting community to work in close harmony.

Many chemicals continued to be subject to export licensing control, which was understandable so long as such restrictions were kept under continuous revision with a view to their removal. The association had on many occasions drawn attention to the unreasonable time taken in dealing with export applications and much improvement was still desirable.

"With regard to controls generally," said Mr. Nash, "it would only be fair to say that those operating in the chemical trade have worked smoothly and efficiently, and while we do not press for their immediate abolition on scarce materials, we do believe that their administration could be made less onerous on trade if the controls themselves reduced the amount of form-filling and similar obligations which take up so much valuable time of the business community."

The association had been active in protecting the functions of the distributors in the new conditions arising from the nationalisation of the coal and gas industries. Resulting from a meeting arranged by the association with the Director General of Marketing of the NCB a better appreciation of the efficient services rendered by merchants in the disposal of tar products was established, and similar vigilance had been devoted to the Gas Bill and especially to the clause which provided for the co-ordination of the marketing of carbonisation products.

Cause for Vigilance

In reply to a memorandum from the association, the Minister stressed that the power conferred by the clause was only permissive and that nothing in the Bill prevented the Area Gas Boards making full use of the merchanting organisations. . . ." "We must, however, continue to be vigilant in these matters, because the ultimate national good is often obscure to officialdom in the present tendency for regimentation and centralisation," added the chairman

"The British merchant organisations have a tradition in the world of commerce for sound principles in trade, and that is a national asset which is indispensable to British economic recovery. These points are sometimes overlooked, or their value underestimated by those who seek to centralise buying and selling.

"We recognise that there must be a closer understanding between Government and industry but there must also be more encouragement and freedom for the established marketing machinery for raw materials and commodities."

Anniversary Lunch

Further cordial recognition of the solid services rendered by chemical wholesale distributors and by the association's president, Mr. Victor Blagden, who has held office since the organisation was established, was paid from several sources at the 25th anniversary luncheon. Among the guests, to whom a toast was proposed by Mr. Nash, were Sir Patrick Hannon, M.P., Lord Glenconner, Dr. G. M. Bennett, F.R.S. (Government Chemist), Sir Harry Jephcott, Mr. J. Davidson Pratt and

(*Continued overleaf*)

Mr. R. B. Jackson, representing the paint industry.

Sir Patrick Hannon, responding, affirmed his conviction that in current difficult conditions insufficient emphasis was given to the rôle of the merchanting organisation in maintaining the industrial life of the country. The merchants of this country had been engaged for fully 2½ centuries in building up our prestige, honour, decency and integrity to a position foremost among the nations of the world.

Their severest problem at the moment, he suggested, was associated with the increasing load of taxation in its effect upon the urgent problem of prices, yet no suggestion of affording relief gained any acceptance in the House of Commons. As president of the British and American Chambers of Commerce, he could testify that the burden of taxation was producing in export trading the most serious impediment this country had to face, and with it he coupled the superabundance of forms. He urged them to press the claims of the merchant, "the man who carries the bag," who fully deserved to be in the forefront, now occupied by those concerned with production.

Dr. G. M. Bennett, proposing the toast of "The Association," with which he coupled the name of the president, testified to the happy relations which prevailed between the association and his department of the Government, where in his experience

"Official tape was palest pink
"Not as red as you would think."

His department was continually called to provide definitions of chemicals—often no easy matter—for the purposes of Key Industry Duty. The questions might seem pettifogging but upon the answers depended large sums of money in tax. He congratulated the association on the part it was playing in the all-important export trade and he assured them that he and his staff would always collaborate with them to the full, formally and informally.

The president, after warmly acknowledging the compliments extended by Dr. Bennett, observed that "there were at the moment a number of very young Ministers who think they can run our business better than we can ourselves. I have had 60 years' experience as a merchant . . . and after that I still think a pennyworth of experience is worth a pound's worth of theory." He took satisfaction in the fact that the association now had 110 firms as members and had been able to put forward successful constructive schemes for the distribution of a number of commodities.

FIRST ERP SHIPMENTS: FEW DYES AND CHEMICALS

AUTHORISATION of $39,647,541 for five countries, representing the first major shipments of industrial raw materials for European recovery, was announced this week by Mr. Paul Hoffman, ECA Administrator, bringing the total commitments for United States-financed purchases for Europe to $202,394,628. The announcement coincided with the much criticised decision of the House Appropriation Committee to recommend the allocation of only $4000 million of the $6800 million requested for ERP in the 15 months ending June 30, 1949. The largest part of the new authorisation consists of $24,970,000 worth of coal to be purchased in the United States by the French Government and about $2,200,000 worth of the fuel for French North Africa (location of purchase not announced). Most of the remainder of the total will be spent for grains and flour for Norway, the Netherlands and Greece.

The fifth country sharing in the authorisation is Austria, allocated $2,116,155 for the purchase of brass, copper, iron sheets, tin plates, superphosphate and basic slag. $1,230,000 of Austria's share will be spent on purchases of superphosphate and basic slag which will be contracted for by the United States Army in Belgium, Luxembourg or Switzerland.

In a summary of European shipments thus far authorised, ECA listed, among others, the following commodities, and the amounts of money allocated for each:

Coal	£40,725,000
Inedible fats and oils	2,946,000
Fertiliser	1,230,000
Oilcake and meal	1,007,000
Metals	886,155
Dyes and chemicals	842,200
Petroleum products	173,797
Wheat	73,521,215

Synthetic Rubber Production Stopped.—By order of the British military authorities in Germany, output of synthetic rubber of the Buna type is to come to an end as from July 1, 1948. The quantities of coal thus made available are to be exported and the foreign exchange derived will be used for the import of natural rubber. It is reported that some 3400 tons of natural rubber are to be shipped to the Bizone.

INDUSTRIAL INJURIES FUND

Effect of State Administration Next July

WHEN the National Insurance (Industrial Injuries) Act, 1946, comes into operation on July 5, 1948, there will be an important change affecting employers liability for compensation to employees in respect of injuries by accident (or the contracting of an industrial disease). Whereas the employer's present liability in such contingencies is continually present, after July 5 compensation payments will be derived from the fund to be formed under the new Act.

This will be called the Industrial Injuries Fund and will receive all revenue and provide all benefits and other necessary payments arising under the scheme. There has hitherto been no Government insurance scheme, and insurance (except to a limited extent in coal mining) has not been compulsory. The risks have usually been covered by insurance with ordinary insurance companies. Under the Government scheme contributory insurance is compulsory for all firms.

Insured Categories

The pre-requisite for an employee to obtain compensation is the same as under the old schemes—the injury must be one arising out of and in the course of the employment. Whereas under the Workmen's Compensation Acts, non-manual employees were included in the scheme only if their earnings were not more than £420 per annum, now both manual and non-manual employees are included, irrespective of earnings.

The position broadly is that all persons who come in Class A (employees) of the National Insurance Act 1946, are insurable under this injuries scheme; incidentally, persons in Class B (self-employed) and Class C are outside the injury scheme.

The contributions payable will ordinarily be included with the stamp for the main scheme, but it should be noted that if a married woman worker elects not to be insured under the main scheme (she has certain options) she is nevertheless insurable under the Injury Insurance scheme; contribution would then be at the rates for the injury scheme only. A point of interest is that anyone employed, regardless of age, is insurable under the injury scheme, both employer and employee paying.

The full rates for Injury Insurance are: for men 18 years and over 8d., women 6d., boys under 18 years 5d., girls 4d., half being recoverable from employee. Thus stamps for the main insurance scheme and this will cost 9s. 1d., 7s. 1d., 5s. 4d., and 4s. 3d. respectively, of which will be recovered from the employee 4s. 11d., 3s. 10d., 2s. 10½d., and 2s. 4d. respectively.

The benefit of chief importance will be the Injury Benefit—*i.e.*, 45s. per week for six months, plus 16s. adult dependant, with 7s. 6d. for the first or only child (the Family Allowances scheme covers the others). After six months cases will rank for Disablement Benefit, until an assessment of disability is made, when the case may be classed as a Disability Pension, the amount of which will be according to the degree of disability, of which the maximum would be 45s.

An "under 100 per cent" pension may be plus 20s. per week (or less) if the person cannot follow his usual occupation, or 20s. in all cases, if unemployable; furthermore, 20s. to 40s. may be allowed if constant attendance is required on account of the injury.

There is an important change from the procedure in the treatment of fatalities. Previously the compensation was by lump sum to the dependants; now, except that a gratuity is payable in some cases, there are no lump sum payments and the compensation is paid weekly. A widow will get 30s. per week if she is 50, if there is a child, or if she is incapable of self support, and 7s. 6d. will be provided for a child. A widow in other circumstances will receive 20s. per week.

Important Points to be Noted

An important principle of this new scheme, is that the compensation amounts are based on the degree of disability and the same rates apply to all persons, irrespective of their usual earnings.

Many provisions of the old scheme will continue—with modifications. Thus, notification of the injury to the employer must be given as early as possible, but an entry in an accident book is sufficient.

Medical certificates must be obtained, but insurance officers will examine claims. If they have a doubt whether the injury comes under the scope of the scheme, or whether the claimant is incapable of work, they can refer the case to a local tribunal.

Recourse to such a Tribunal can likewise be had by an applicant dissatisfied with an officer's decision. These local bodies are composed of representatives of employers and of employees with an independent chairman. Appeals from their decision can be made to industrial commissioners, and medical questions will go to a medical board or a medical appeals tribunal.

Tar and its Derivatives

Statistical Review of Production and Prospects

by W. K. HUTCHINSON*

SOME 10 gallons of tar are produced per ton of coal carbonised, say 5 per cent of the weight of the coal, and the total production in Great Britain is now 2.2 million tons per annum. This compares with 16 million tons of petroleum products used annually. Obviously the tar industry cannot solve our liquid fuel problem even though, as may be shown later, it can make a valuable contribution in some special fields. Tar, however, is in the unique position of being the most readily available source of the large and important group of aromatic carbon compounds.

The characteristic structure of coal tar is one of six carbon atoms which have united to form a ring. Chains of carbon atoms may branch from any member of the ring and two or more rings may share pairs of carbon atoms, giving complex arrangements.

The Main Products of Tar

Tar remains the most important source of naphthalene where two rings are condensed together, anthracene with three rings, the tar acids in which oxygen enters into combination with a carbon atom in the ring, and the tar bases where nitrogen enters into a ring of carbon atoms. It is in these connections that tar provides an essential source of the raw materials for many branches of the chemical industry.

The sum of these special products does not amount to much more than 5-10 per cent of the weight of the tar, and it is clear that fundamental revenue will derive from the disposal of the 85 per cent or so of bulk products, comparable in their nature to the bulk products arising from the treatment of crude oils, always having regard to the special properties which tar products derive from their essentially aromatic character.

The preliminary distillation of tar followed by the removal of these special products will yield 50 per cent of its initial weight as pitch, and 35 per cent as creosote.

In 1947 the production of pitch for all purposes was 564,000 tons or 26 per cent of the tar produced, and of this 200,000 tons were used for briquetting in this country, and 216,000 tons were exported, also for briquetting.

Creosote has its own special market for wood-preserving and large quantities are shipped each year to America, and when available, to the Continent. The quantity of wood-preserving creosote exported last year was 160,000 tons and probably fell below the demand. The home market took 45,000 tons. A new outlet for creosote, especially the lower boiling range which is not so suitable for wood preserving, was found before the war in the hydrogenation plant of I.C.I., Ltd., at Billingham, and was specially favoured by the demand for high octane spirit. This took 110,000 tons. Various other uses account for approximately 100,000 tons more, making a total of 415,000 tons of creosote, equal to 16 per cent of the crude tar distilled.

The third market for tar products is that of refined tar for road making, the total production being 740,000 tons or 33 per cent of the crude tar. Home use accounts for 490,000 tons per annum, and a further quantity of 170,000 tons is exported, mainly to France. For the purpose of production planning, road tar is generally regarded as a mixture of two-thirds pitch and one-third of creosote.

Road tar to-day is a most carefully controlled blend of pitch with specially selected qualities and proportions of creosote to an exact specification for each type of work. It is hoped to extend its use for tar carpets, the name given to wearing courses of about 2 in. thick which have specially valuable non-skid properties and good riding qualities.

In face of active competition from asphalt and petroleum residues, both of which have admirable qualities, the need for an active policy of research and development is keenly appreciated by the industry, and mention should be made of the excellent work being carried out at the Road Research Laboratory and sponsored by the British Road Tar Association, a body representative of all producing and distilling interests.

Tar Fuel

The last major use of the main products of tar distillation is as a liquid fuel. During the last war, when all foreign markets closed and there was a great scarcity of imported oils, the use of tar fuel was greatly encouraged. To-day, after allowing for other markets, we have only 210,000 tons available for sale, equal to 10 per cent of the crude tar. The mixture generally sold con-

* Abstract from the address by Mr. W. K. Hutchinson, managing director of the Gas Light and Coke Company to the Fuel Luncheon Club.

tains approximately 50 per cent of pitch and 50 per cent of creosote, and is comparable with black oil. For certain purposes it has very definite advantages. The flame is intense, with a high radiation release and the sulphur content of the order of 0.6 per cent, is substantially below that of the petroleum fuel oil as received in this country to-day.

Reviewing these four main products and their markets, it will be observed that in three cases tar is used either directly or indirectly as a fuel: pitch when blended with coal, creosote when hydrogenated to motor fuel, and tar fuel.

It is generally hoped that the special properties which distinguish tar from other hydrocarbon mixtures are susceptible of development and that wherever possible tar should find its place as a raw material in fields where these special properties can be utilised, but it will probably always be necessary for some substantial quantity to be disposed of as fuel in one form or another.

Benzol

Benzol is really that part of the tar which remains uncondensed in the normal technique of gas purification and is present to the extent of rather more than three gallons per ton of coal carbonised. The annual production of refined benzol at present is only about 265,000 tons. This should increase substantially as more coal- and gas-making plant become available, provided that the price remains at a level which will encourage production by the gas industry.

Benzene is the starting point for styrene, synthetic phenol, and nylon, to name only a few, and there is every indication in the U.S.A. at least that the demand for these purposes is going to outrun the supply.

Toluene, the next member of the group, is principally used for explosive manufacture, and in peace time supplies are in excess of demand. The xylenes, on the other hand, are becoming increasingly important as raw material for plastics, so that the petroleum industry has found it worth while to install most elaborate plant for the separation of the quite small proportion of xylene present in carbon oils, and the production from petroleum may well be the controlling factor in future.

So far as can be seen, petroleum, however, is not a possible source of benzene, except when its properties are profoundly modified by cracking treatment.

Continuing upwards from the typical benzol hydrocarbons to those derived from tar, we have first naphtha, a complex mixture based mainly on the single six-atom ring, useful as a solvent and in paints and lacquers. Next comes naphthalene with its twin ring of carbon atoms, a most important raw material for dyestuffs and plastics, with a further wide use as an insecticide. Its recovery in the pure form is made easier by the fact that it is a crystallisable solid. Coke ovens and horizontal tars should yield nearly 4 per cent, but tars from vertical retorts have not hitherto shown commercially useful yields.

There is no readily available alternative source of naphthalene and demand has already outrun supply both here and in the U.S.A. This is mainly due to the growth of phthalic anhydride production, and the many new uses which have been found for this substance.

Some increase in production from tar can be foreseen by improved methods and by the treatment of tars from which recovery has not been considered profitable. A little more can be expected from the catalytic cracking of heavy oils. Relief is most likely to come from increased production of orthoxylene from petroleum refining processes, as orthoxylene can be used instead of naphthalene in the production of phthalic anhydride.

Anthracene is used for dyestuffs, and is only recoverable at the requisite purity from straight coke oven and horizontal tars with a yield of slightly above 1 per cent of 40 per cent purity.

Most of the other hydrocarbons which constitute tar are either present in very small proportions or have not yet found outlets of commercial significance, but we may confidently expect that new uses and new methods will be found to make possible, and we hope, profitable, the recovery of many of these substances.

Tar Acids

The next group of tar chemicals is that of the tar acids of which the best known and simplest member is phenol or carbolic acid. With the addition of hydrocarbon side chains we have the group of cresylic acids and xylenols. Recovery is nearly complete and amounts to an overall figure of 2½ per cent of the tar. All these have wide applications in the field of disinfectants and as raw material for the chemical industry and the demand for phenol has quite outrun supply. Phenol is now produced synthetically from benzene on a very large scale.

The only remaining source of tar acids is in the liquors treated for ammonia recovery. We have been able from these waste liquors to obtain an additional production equal to 30 per cent of the present yield from tar. The difficulty in applying this generally is that the sources of supply are widely dis-

(*Continued overleaf*)

persed and relatively small in scale as most coke ovens and gas works treat the liquor at the point of production.

The third group of tar chemicals is that of tar bases where nitrogen is incorporated in a ring of carbon atoms. The simplest member is pyridine and for this as well as for other tar bases with side chain addition or multiple ring structure there is a steady and increasing demand. The position is as yet too complex to indicate whether these demands are likely to be sustained at the present level, but there seems to be no simple synthesis leading to a substantial alternative supply.

No attempt has been made here to deal at length with the many thousands of chemicals which derive ultimately from these coal-tar products. To do so, might give rise to a tendency to lose a proper sense of perspective. It is sufficient to indicate the key position which these by-products hold in relation to the supply of materials having the characteristic ring structure of the benzene molecule, even though there is the tendency for alternative sources of supply to arise when prices reach an adequate level.

There is no doubt that the unique position which coal by-products held in earlier years has gone for good and it will be increasingly important to see that each by-product is treated efficiently at every stage.

The sources of supply are necessarily very dispersed and with many of the markets for road tar and fuel ready to hand, it is not always worth while to concentrate the crude material into large units for further processing.

This tendency to dispersal makes it difficult to carry out complicated refining processes, but it should be possible to arrange each unit so that it carries the process to the limit which it finds economically and technically possible, with a gradual concentration of the resulting products into central units for final treatment and refining. The co-operative schemes for refining tar acids which now operate have shown how this can be done.

It is appropriate that at this point in its history the tar industry has seen the need to co-operate in research, and a new research organisation has been formed under the joint auspices of the producing and distilling sides of the industry. It is now starting to work, assured of unqualified support from all concerned.

ASSISTED COMBUSTION : EFFECTIVE SYSTEM AT COURTAULDS

COURTAULDS, Ltd., has adopted a system—developed by Mr. R. L. Hunt, one of the company's combustion engineers—which is designed to improve the combustion of low-grade and fractious fuels burnt on chain-grate stokers. Reporting this in *Fuel Efficiency News*, May, the Ministry of Fuel and Power states that Ministry engineers who have recently inspected the system, found it effective on the water-tube and Lancashire boilers.

Central Electricity Board engineers, who have also seen the system, are reported to have been very favourably impressed and propose to give it an extended trial on power station boilers.

The system is described as consisting of a series of steam jet nozzles attached to a steam supply bus line which is mounted on the lower end of the coal feed regulating shutter, so that the jets, which are in the horizontal plane, constantly retain their relative position in the incoming fuel bed.

A 50,000 lb. per hour water-tube boiler with 14-ft. grate was fitted with 44 nozzles, 30 1/16-in. dia. over the central portion of the bed on 3-in. centres, and seven 3/32 in. dia. at each wing on 4-in. centres. The Lancashire boiler had five 1/8 in. dia. nozzles fitted over each furnace.

An operating steam pressure varying between 15-50 lb. p.s.i. is required, and the total steam consumption is in the region of 1 per cent of the boiler output.

The operation of the jets causes a vacuum over the front portion of the fuel bed, whereby air and gases from this area are entrained by the high velocity of the steam and projected into the volume of burning gases above the active bed further back on the grate. The jet loses its identity here, and turbulence and admixture with the hot gases result.

The hot burning gases flow back to fill up the vacuum caused by the jet of steam. They do so on a well-defined path, those below the jet making direct contact with the surface of the incoming fuel and giving immediate ignition, while those above the jet tend to increase the temperature of the ignition arch and thus further promote ignition of the fuel by radiation.

Manufacture and use of the device is free to anyone within the U.K. and the Isle of Man, the sole condition being that the device should be marked "Courtaulds, Ltd., Patent Application No. 23985-47." Export rights, manufacture and use overseas and the exploitation of covering patents rest with Babcock & Wilcox, Ltd., London.

CYANAMIDES AND MELAMINE

New Patented Processes from France

NEW methods of production of free cyanamide, dicyandiamide and melamine (Eng. Patent Applications Nos. 191314/1947 and 4000/1947) are stated to have been introduced recently by the Soc. Anon. des Manufactures des Glaces et Prod. Chim. de St. Gobain, Chauny et Cirey of Paris. In addition, an improved process for the manufacture of hydrocyanic acid (Eng. Patent Application No. 32955/1947) is claimed by Cie. de Prod. Chim. et Electromet Alais, Froges, et Camargue, of Paris.

This latter method is based on the catalytic dehydration of formamide ($HCO—NH_2 \rightarrow HCN + H_2O$). This hydration is well known and already a large number of different catalysts have been tried, but the present patentees state that most of these have been unsatisfactory. They claim, however, to have found beryllium and its oxide highly effective at a temperature of about 600°C. under ordinary pressure, or slightly above or below. Instead of formamide, ammonium formate may be used or a mixture of this with formamide. Dehydration is very rapid and the HCN collected is separated from the water, dried by the usual means, and then condensed or absorbed in alkali or other solution with a view to the manufacture of cyanides or alternatively used directly for various syntheses.

For example, using beryllium oxide or manganous oxide as the catalyst, formamide vapours are passed through a red copper tube filled with molten crushed MnO kept at a temperature of 515-525°C. at the rate of 4 kg./lit. catalyst per hour. The yield of HCN is 90-95 per cent if MnO is replaced by metallic Be at temperatures of 610-620°C. the rate of flow of formamide is 6 kg. and produces the same yield as before but with 50 per cent greater production capacity. If fritted or molten BeO is used at 560°C. the rate of flow of formamide may be increased to 10-12 kg., and the yield is 87.90 per cent, thus trebling the capacity.

Nitric Acid as Medium

The preparation of free cyanamide has been described by A. J. Courtier, engineer of the St. Gobain company (*Chim. et Ind.*, 1947, *58*, 545-7) who briefly notes its early history and relations to urea, dicyandiamide and melamine. Methods hitherto used for freeing the cyanamide from its calcium salt (by sulphuric or carbonic acid) are considered laborious and inconvenient, and the author claims to have found nitric acid a more suitable medium as the salts produced are soluble. This acid, however, must be used under specified conditions to avoid excessive heat and decomposition. The cyanamide may be finally obtained in organic solution, say, ethyl acetate, containing 3-6 per cent of cyanamide and this is stable at temperatures up to 100°C. Hydrochloric may be used instead of nitric acid, but with the latter a valuable concentrated fertiliser (calcium nitrate) is obtained the value of which is said to be much greater than that of the original calcium cyanamide. It appears, too, that a certain amount of free carbon or graphite is also formed among the by-products.

No Bases or Pressure

The preparation of cyanamide solutions, presumably in organic solvents, has been claimed by the St. Gobain company in Eng. Pat. Application No. 4000/1947; and of dicyandiamide and melamine in Eng. Pat. Application No. 19314/1947 which has just become open to public inspection. These polymers (di- and tri-) have hitherto been prepared by the action of heat on cyanamide, sometimes in the presence of a base such as ammonia or magnesia and the cyanamide itself has been previously obtained by the action of acids in aqueous media on calcium cyanamide, as mentioned previously, but this generally requires concentration before di- or trimerisation. Yields both of these and of melamine are apt to be low even when heated with ammonia.

The present invention claims an improved method without the use of bases or pressure and with very good yields. The dimer is prepared from cyanamide and melamine from the dimer or direct from cyanamide. The starting material is introduced into a relatively large amount of liquid at a temperature of 80-130°C., the liquid being inert to cyanamide or products. For melamine suitable liquids are tributylamine, diethyl aniline, phenyl ether, tetraline, etc. The starting material, cyanamide, may be introduced solid, molten, or in solution.

Into an inclined heating tube filled with tetraline kept at boiling point 10 kg./hr. of a 40 per cent solution of cyanamide in ethyl acetate is introduced continuously and the solvent is drawn off at the rate of 6 kg./hr. from the delivery end of the condenser placed above the reaction tube. Melamine formed in the tetraline is pulverised by mechanical agitation and falls to the bottom of the tube whence it is removed by pumping and delivered to filters. About 4 kg. melamine are recovered per hour.

MODERN METHODS OF ANALYSIS—III

Instruments as Analytical Tools

From a Special Correspondent

IN the first article in this series, mention was made of the debt which the analytical chemist owes to the rise and development of physical chemistry. This debt, although not confined to the field of instrumental analytical methods, is most evident there, since there are few physical properties which have not, at one time or another, been made the basis for an analytical method.

Before proceeding to a consideration in more detail of those physical methods which find widest use in analysis to-day, it would be advantageous to review generally the whole field of instrumental analysis, so as to give some indication of the vast range of methods on which the analytical chemist may call to solve his problems.

Primacy of the Microscope

There is little doubt that the microscope was the first instrument, in the strict sense of the word, which was applied for analytical purposes. In the early 19th century, it was employed by Raspail in his investigations on starch. Although it must have been employed for the simple process of the separation of heterogeneous materials before that time, chemical analysis under the microscope, properly interpreted, began with this work, which involved, it is true, prior *mechanical* separation, but was then rounded off by the performance of actual *chemical* tests, the results of which were observed under the instrument.

It is difficult to trace the subsequent development of chemical microscopy over the next half century. But from the 1860's, textbooks began to appear which were so mature that they indicate clearly that the technique was soundly based, and that its advantages were realised by a considerable body of far-seeing analytical chemists. A textbook, *The Microchemistry of Poisons*, was published by Wormley in 1867, and dealt with microscopical methods, many of them still up-to-date, for the detection of the commoner inorganic and organic poisons. Following other contributions by people like Boricky, Haushofer and Lehmann, Behrens, in 1894, produced his *Manual of Microchemical Analysis* which forms the basis of a large part of inorganic chemical microscopy of the present day.

Next in the list of instruments, historically, comes the spectrograph, or, in its earliest form, the spectroscope. Bunsen and Kirchoff showed conclusively, in 1860, that the light emitted by a large number of the elements under suitable conditions of excitation, such as the Bunsen flame, or, later, the arc, is characteristic of the several elements. Since this is so, whether the elements are isolated, mixed or in combination, it is therefore possible to use an analysis of this light, in the form of a spectrum, for the qualitative identification of a considerable proportion of the known elements in any form.

This work was, indeed, first turned to use in the more exciting problems associated with the isolation of new elements, at least six of which were first recognised by their emission of hitherto unrecorded spectra. But it was not long before it was shown that here was a rapid and reliable method for the qualitative analysis of inorganic substances in normal laboratory practice. This led almost inevitably to the attempt to apply the method to quantitative analysis—first attempted by Hartley.

The attempt cannot be said to have been successful at that time, but the principle was sound. Only the mechanical means for overcoming the difficulties were wanting. That these have since been overcome to a very great extent, first by the efforts of the physical chemist to improve the instruments for their own purposes, and then by the analytical chemists seeking to apply the instruments with greater accuracy, is clear from the widespread use which is made of the spectrograph in certain branches of industry to-day as its most useful general analytical tool.

Physico-chemical Methods

Enough has been said from the historical point of view to show that certain of the instrumental methods in use to-day antedate the inception of physical chemistry as such. However, it is undoubtedly true that the greatest increase in the number of instrumental methods has been concurrent with and dependent largely on the rise of physical chemistry from the beginning of the present century.

Instrumental methods is perhaps too narrow a term, although their present use almost invariably depends on the use of quite highly specialised instruments. More precise designations might be "physico-chemical methods of analysis," or "physical methods of analyses," since the methods to be considered are based primarily on the measurement of a physical quantity which

can be related directly to the content of the substance sought.

However, this leads to further difficulties of definition, since the methods of classical analysis depend on the measurement of mass or volume, both of them undoubtedly physical methods of analysis," since the methods except in very rare and specialised instances, are not normally capable of being classed as instrumental methods. And if they were classed as physical methods, this would justifiably be regarded as pedantry.

An example helps to draw the distinction more clearly. Copper may be determined by a number of recognised classical methods, such as by an iodine-thiosulphate titration, or by precipitation and weighing as copper quinaldinate.

The former method is, of course, of long standing, and is a part of every undergraduate course. The latter, although employing a modern reagent, since quinaldinic acid was not developed for this purpose before 1930, nevertheless relies on classical procedures for achieving the determination. On the other hand, copper may be estimated by means of the colour formed with sodium diethyldithiocarbamate.

The use of colour as a measure of content is a physical method. When it is measured absorptiometrically by means of a photoelectric measuring instrument, the method is clearly seen to fall into the category of instrumental methods, although there is nothing to prevent a rather less accurate result from being recorded, using the older method of simple comparison of colours in Nessler glasses.

Determination by Electrodeposition

Again, copper is frequently determined by electrodeposition. Such deposition of the copper on a platinum cathode by means of the passage of an electric current could, of course, be achieved in the simplest cases merely by making the solution, containing two electrodes, one unit in an electric circuit of which the remaining units were an accumulator and a key for completing the circuit.

In this form the method can only with difficulty be included among physical methods, since it depends on the determination of the mass of copper deposited, and tacit agreement tends to exclude it on these grounds. But in cases other than the simplest, satisfactory results will be attained only by the inclusion, with the basic apparatus, of a number of instruments which soon show themselves to be almost indispensible for the proper application of the method.

A voltmeter, possibly an ammeter, and some means of controlling and regulating the current applied to the electrolytic cell will form the foundation of electrodeposition as an instrumental method, and may be supplemented, from time to time, by the addition of other aids which make the classification even more certain.

Thus it must always be borne in mind, in consideration of these methods, that many of them may be carried out, in their simplest form, in a way which makes them almost impossible to classify. Often, too, these methods of low refinement will give valuable analytical data, so that it is not always wise to assume that unless the apparatus associated with the method carries a panel with half a dozen dials and a considerable quantity of wiring it may be safely ignored.

Electrical Methods

Electrodeposition may be used as a convenient starting point for the consideration of the range of such methods. Electrodeposition also has a long history, the earliest experiments in its use as an analytical tool dating to the middle of the 19th century. Outstanding advances were made by Killiani in the 1880's and by Sand around 1900, and these workers may be regarded as pioneers of a method which is now invaluable.

The earliest methods were concerned simply with the deposition of a single cation, but methods have now developed to the point where it is possible to determine constituents in complex solutions, and, in many cases to carry our serial analyses for several constituents by variation of the conditions and by the use of the method of controlled potential.

Among other electrical methods, one thinks first of conductometric and potentiometric titrations, both of which have been in use for a considerable time.

Conductometric methods make use of the fact that the current in an electrolyte is carried by the ions, and that therefore the amount of current carried will be related to the number of ions in the solution. This is particularly valuable where it is desired to measure conductance in solutions where either the hydrogen or the hydroxyl ion, both ions of high mobility, are being added or removed.

Potentiometric methods make use of the potential developed between an electrode and the ions in the solution into which the electrode dips. Naturally, if the concentration of the ions is altering, the potential developed will alter, and this variation can be followed and can be related to the concentration of the solution.

Both these properties, therefore, lend themselves particularly to the determination of end-points in titrations, and it is of particular value that they are often available in instances where the classical indicator methods for determining the end-point fail through one cause or another.

(To be continued.)

French Coal Gas Production

New Purifying Agents Reported

NEW chemical agents for use in the purification of coal gas in France for which is claimed the capacity to overcome many of the usual difficulties encountered, such as the need for preliminary treatment before use and the silting and loss of permeability due to sulphur deposits, are described in a recent article by Louis Fassina (*Chem. et Ind.*, 1948 (April), *59*, 350-6).

Ferro-Manganese Base

Named after the author, the new materials are based on French supplies of ferro-manganese minerals, and are obtained either by conditioning these materials or by precipitation of iron and manganese hydrates in suitable media. Certain materials, more or less inert, such as clay, silica, peat (slightly humid) are ground up mechanically in the ferro-manganese hydrate mixture to moderate chemical activity with evolution of heat, and to ensure a density of about 0.5 per cent. Density of the commonly used agents has previously been about 0.75 per cent, using sawdust or a similar material as additive to the ferrous hydrates.

An example of one of these preparations made from Lux, Purfer and damp sawdust as used at the Gaz de France works is described. The amount of additive used in this case is thought to be quite insufficient to prevent blocking of the mass with sulphur.

The Fassina purifying agents have a much larger content of sawdust or turf. Since the manganese hydrates are much more active than the ferrous hydrates, total absorptive power may be varied by adjusting the manganese/iron ratio and the additive content. It is thus possible to have a ternary mixture of density down to 0.550 by adding to a mixture $xFe_2(OH)_6 + yMn(OH)_2O$, having a density of 0.75, a quantity of sawdust $(x + y)$ of density 0.350. The sawdust (sciure) amounts to about 50 per cent of the whole, and the product does not cake even when it has absorbed 40-45 per cent of tarry sulphur.

Comparative Tests

Comparatiye tests were made with the Lux and Fassina purifying agents (absorbents), and it is claimed that the latter continued in use for four months without attention. Lux had to be withdrawn and revived after 45 days. When taken out the Fassina was still friable and active though it had had no conditioning before use in the first place.

It may be added that Lux was a German product obtained in connection with alumina or aluminium manufacture, and is no longer made. The important factors in Fassina are said to be its moisture, hydroxy, manganese and ferric iron contents, the importance of the two former being shown by the several exothermic purifying reactions involving hydrogen sulphide and sulphur which are also listed. Favourable results with Fassina were reported from the Angoulême works of the Cies. Réunies de Gaz et d'Electricité in 1945, and further tests have been reported from the Landy gasworks, Paris, of Cie. Gaz de France, in which a 30 cu. m. mass of the new purifier consisting of about 50 per cent hydrated oxides and peroxides of manganese, 30 per cent dry sawdust and 20 per cent moisture were used. On a large scale such as this the wet sawdust is said to catalyse the purifying reactions. It should contain both large and small particles. Analysis and sifting after use shows that the Fassina absorbent contained some 40.33 per cent sulphur free from tar. A new method for analysing the sulphur and tar retained by the new absorbent, based on extraction with carbon disulphide and absorption of the tar on animal black (charcoal), is also described in the article.

May Replace Imports

Finally, it is claimed that with the use of the Fassina products there is great saving in plant and storage space in addition to labour. Works for the manufacture of the new purifier on a large scale are in course of erection, and it is hoped before long to supply the needs of all the French gasworks and dispense completely with imported purifying agents.

MORE BELGIAN CHEMICALS

BELGIAN chemical industry, in the first quarter of this year, accelerated its earlier recovery from wartime conditions in several directions. Nitrogen output, which averaged 7343 tons per month in 1938, rose to over 12,000 tons in March. The post-war peak was in January, nearly 14,000 tons. Soda output is improving and production of sulphuric acid is running at an annual rate of about 900,000 tons, a figure which is not far from the pre-war output. The position in the coal tar sector is also said to be good. There has been a considerable re-adjustment in the direction of Belgium's chemical export trade, for a number of important pre-war markets, such as France, have reduced their purchases, chiefly because of clearing difficulties.

NEW HYDROGENATION EQUIPMENT

Rapid Hardening of Edible Oils

A NOVEL method of achieving intensive mixing in the hydrogenation process, utilising a powerful pump, has been devised by Bamag, Ltd., and incorporated in a newly produced unit known as the Bamag-Saroc Express Hydrogenator. Oil, hydrogen and catalyst are fed simultaneously into the pump, which acts as an oil dispersion device and, due to the intensive contact of the three phases, the reaction proceeds at a much faster rate than in other equipment employing orthodox mixing methods such as the turbo-stirrer or compressor.

The Bamag unit can harden a ground nut oil to a melting point of 36-38° C. in about 15 minutes, a process which formerly took about two hours. It is also capable of hardening a highly unsaturated oil, such as sardine or herring oil, to almost complete saturation, iodine value 1, within approximately 60 minutes. Oleic acid can be transformed into stearic acid in 60-70 minutes.

Construction and Operation

A centrifugal pump, fitted with special glands and water-cooled, forms the basis of the hydrogenation unit and the other main parts of the apparatus are the heat exchanger, preheated oil receiver, pump feed vessel and separator.

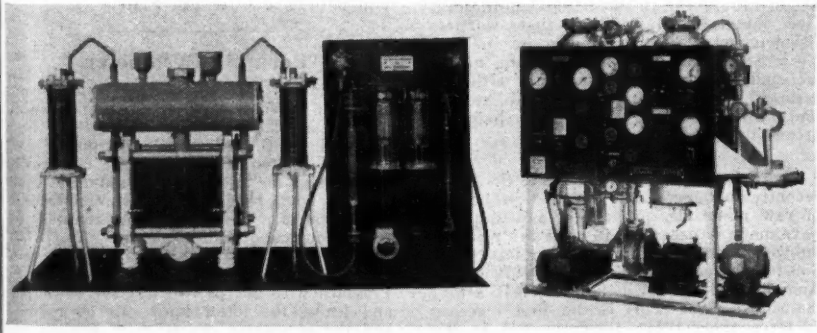
The soft oil first enters the heat exchanger, where its temperature is raised by means of the outgoing hardened oil. The preheated oil then passes into the oil receiver whence it flows into the pump feed vessel. Suitably prepared catalyst is added to the oil in this vessel or is mixed into it at an earlier stage. The oil passes from the bottom of the feed vessel to the pump accompanied by the catalyst. Owing to its weight, the catalyst accumulates at the bottom of the feed vessel and assures a plentiful supply of catalyst into the pump. Hydrogen enters the pump in two ways: by direct injection of fresh hydrogen, and by means of a special suction pipe, which ensure that any surplus gas collecting in the top of the feed vessel is recycled. By this simple arrangement a simultaneous feed of oil, catalyst and gas into the pump is assured, the reaction taking place at an exceedingly fast rate, due to the intensive mixing action of the pump.

Gas Circulation Unnecessary

It is not necessary to circulate the hydrogen, and the small amount of gas which reaches the top of the feed vessels is entrained there in the fast stream of oil.

When the reaction is completed, the hardened oil passes to the heat exchanger, where most of its heat is given up to the fresh charge. The oil is then filtered to remove the suspended catalyst.

Hydrogen produced by any of the usual commercial methods can be employed in the Hydrogenator. Such methods include the electrolytic, steam iron, catalytic water gas, and hydrocarbon reforming processes using natural gas, butane, propane or similar commercial system. For the hardening of fatty oils and acids, electrolytic hydrogen, however, is most suitable owing to its very high purity.



Newly produced equipment for all processes of hydrogenation of oils. Left : a small-scale electrolyser designed to produce some 10 cu. ft. of hydrogen of 99.95 per cent purity and 5 cu. ft. of 99.5 per cent oxygen hourly. Right : the new "Express" hydrogenator, which is stated to be capable of hardening a groundnut oil to 36-38°C in about 15 minutes *(Courtesy of Bamag, Ltd.)*

American Chemical Notebook

From Our New York Correspondent

SPEAKING at the recent annual meeting of the Society of Plastics Industry at Atlantic City, New Jersey, Mr. Frank Carman, of the Plastic Materials Manufacturers' Association, said that the industry in the U.S.A. could look forward to an improved supply of chemicals. Mr. Carman pointed out that additioonal facilities for the manufacture of methanol and formaldehyde would soon overcome shortages of these basic materials and the production would also be increased during the next six months. Phenol production was already at a rate somewhat above the 1947 average and a limited increase in the output would be expected in the third quarter, although no substantial increase was possible before 1950.

* * *

Mr. Richard J. Lund, supervisor of the engineering economics division of the Battelle Memorial Institute, Columbus, Ohio, told the raw materials committee of the National Industrial Conference Board recently that American dependence on foreign sources of supply for strategic metals and materials may necessitate reinstatement by the Government of some measure of control over usage and distribution. Foreign suppliers, he said, are "uncomfortably distant," for such metals and minerals as tantalum, tin, chromium, cobalt, columbium, manganese, tungsten, vanadium, block and splittings mica, amorphous graphite, long-fibre asbestos, corundum and industrial diamonds. He recommended that stockpiling of these materials should begin as soon as possible. Mr. Lund predicted large-scale use of titanium in the structural and decorative metals field, adding that wartime developments of titanium deposits in New York State had virtually given the nation self-sufficiency in this mineral, although resumed imports from India and Norway had been necessary to meet the sharp increase in post-war requirements.

* * *

The E.I. du Pont de Nemours & Co., Inc., recently announced that increases in the cost of raw materials, production and shipping have made it necessary to raise the price of anhydrous ammonia, in tank car lots, from $59 for the commercial grade to $70 a ton. Ammoniacal liquor will now cost $76 a ton, instead of $65. This is the first increase in price since 1944. Improvements in the manufacturing process, however, have made it possible for the firm to reduce the price of polymethacrylic acid textile size from $1.45 to $1.25 a lb.

The new formaldehyde unit at the Indian Orchard plastics division of Monsanto Chemical Company, construction of which began in October, 1947, will be completed and in operation by July 1. The majority of the new plant's output will be used by Monsanto in Springfield, and also piped to the Shawinigan Resins Corporation, which is partly owned by the Monsanto Company. The remainder will be used by other Monsanto plants.

* * *

Commemorating the 95th anniversary of its Merrimac division's chemical production and development, the Monsanto Chemical Company this week formally dedicated its new $750,000 general research laboratory at Everett, Massachusetts. Ceremonies marking the occasion were attended by civic and educational leaders and research experts, including Dr. Charles A. Thomas, executive vice-president of Monsanto and president of the American Chemical Society. The three-storey building is equipped to handle research and experimentation on a wide range of industrial chemicals and processes and has separate laboratory facilities for textile, leather, paper and coating materials, dye and steel and wire trades. Meanwhile, at the company's headquarters in St. Louis, Missouri, the petroleum chemicals department announced the introduction of a magnesium type detergent-dispersant for compounding premium and heavy duty lubricating oils. Santolube 222, said to be the first magnesium type detergent oil additive made commercially available, imparts a high degree of detergency at a relatively low concentration and affords a lower ash content.

Portable Pyrometer

A new portable pyrometer, which seems likely to have a number of useful applications in the industrial field, has been designed by the Electrical Instrument Co., Ltd., Hillington, Glasgow. The instrument is designed for use with platinum/platinum 13 per cent rhodium and chromel/alumel thermocouples, but it can be adapted for thermocouples of other metals. The standard type of thermocouple covers a temperature range from 600° C. to 1600° C. Provided with one or two test thermocouples and leads, the lower limit can be reduced and the pyrometer can be used for periodical and frequent checking of the temperature points in industrial plants where temperatures within the range from a few hundred up to 1600° C. are employed.

PURITY CONTROL OF STYRENE

Effective Determination by Double Freezing Point

A SIMPLE method for the determination of the purity of styrene, utilising an empirical equation relating the percentage of styrene by weight in the sample to two freezing points obtained experimentally with specially designed apparatus, particularly adapted to industrial process control, has been developed by Dr. J. F. Masi of the U.S. National Bureau of Standards.

One of the freezing points is taken on a part of the original sample, while the other is determined from a portion of the sample from which the more volatile hydrocarbon impurities have been removed by evaporating and recondensing the styrene. The procedure, devised for the Office of Rubber Reserve, is now in use in all of the Government-controlled plants making GR-S

Control of Components

For calculation of plant inventories and plant efficiencies, and in order to produce rubber of uniformly high quality, it is necessary to know the purities of both fresh styrene (pure, except for a residue of less than one per cent of the ethylbenzene from which it is obtained) and recycle styrene (which contains no more than 85 to 90 per cent of the pure substance) and closely control the amount of styrene in the blend made from them.

Measurement of freezing point depressions is one of the most convenient ways of determining the purity of hydrocarbon compounds. Ordinarily, lack of time, personnel, and equipment in industrial laboratories precludes the use of the more accurate technique using platinum resistance thermometers; the Bureau's practical freezing-point procedure can be effectively employed by operators lacking technical training.

Incompatability

The principal impurities in recycle styrene are ethylbenzene, 4-vinylcyclohexene (butadiene dimer), and 1,3-butadiene; comparatively small amounts of other hydrocarbons are also present. A single good freezing point value would suffice to determine the purity of a styrene sample if only the molecular percentage purity were desired and if all the impurities formed ideal solutions with styrene.

In practice, however, it is necessary to know the percentage purity by weight; moreover, ethylbenzene and 1,3-butadiene do not form ideal solutions with styrene.

The new procedure overcomes these difficulties by removing the butadiene and other volatile impurities and obtaining the freezing point of the mixture of styrene, ethylbenzene, and 4-vinylcyclohexene which remains. This freezing point, together with the freezing point of the original sample, is then used to calculate the purity of the styrene.

The separation of low-boiling impurities is accomplished by completely evaporating 15-ml. of the sample under low pressure and passing the vapour through a trap kept at −65°C. The styrene, ethylbenzene, and 4-vinylcyclohexene solidify on the walls of the trap, while the light hydrocarbons pass through without condensing. The empirical equation relating the weight percentage of styrene to the two freezing points assumes that no important impurities other than those mentioned are present and that ethylbenzene and 4-vinylcyclohexene occur in nearly equal amounts.

Simple Control

The freezing points are obtained by a procedure designed to provide the highest possible accuracy consistent with the rapid taking of observations by relatively untrained staffs. The styrene is placed in the innermost of a nest of three test tubes immersed in a chloroform-carbon tetrachloride freezing mixture contained in an unsilvered Dewar flask. Throughout the determination, the sample is stirred at the rate of about 150 strokes per minute by a motor-driven stirrer, and the bath is maintained (by addition of small pieces of dry ice) within 0.5°C. of a temperature selected, so that the rate of cooling of the sample while freezing, is near 0.1°C. per minute.

The temperature of the sample, while cooling, is observed every half-minute beginning a few minutes before freezing is expected to occur and continuing at least ten minutes after freezing begins. As some undercooling always takes place, the actual freezing point is found by extrapolating the freezing curve back to the liquid cooling curve. The freezing point obtained by extrapolation is then corrected by applying the thermometer-calibration and emergent-stem corrections.

To secure the greatest possible accuracy, a liquid-in-glass thermometer readable to 0.01°C. was designed at the Bureau. The thermometric liquid is a thallium amalgam which remains fluid below the lowest temperatures likely to be encountered in styrene analyses. (Such thermometers are now available commercially).

(*Continued overleaf*)

U.S. View of Pollution Problems

The Industrial Chemist's Responsibility

SPEAKING at a recent industrial waste symposium of the American Institute of Chemical Engineers, Dr. Mark E. Putnam, vice-president of the Dow Chemical Company, said that industrial administrators must assume complete responsibility for the elimination of the pollution of streams and rivers in the U.S.A. The alternative would be compulsory regulation.

Dr. Putnam said industries using surface water supplies were complaining that their source water was polluted and must be treated. He suggested it would be much more appropriate for each company to clean up its own wastes than for each to be forced to clean up its supply. Waste elimination frequently turned out to be much less costly than anticipated because in the effort processes may be made more efficient or valuable materials salvaged.

Pollution problems confronting the chemical manufacturer were more complex owing to the industry's "entry into new fields of manufacture, bringing new materials, new processes and new wastes to be dealt with." He added, however, that any industrial waste disposal programme is usually a long range one and both public and legal authorities should be made aware of the nature of the problems involved.

The treatment of metallurgical plant wastes formed the subject of another address to the same gathering delivered by Mr. H. D. Unwin, of Albert Kahn, of Associated Architects and Engineers, Inc., of Detroit, Michigan.

Use and Conservation

Taking as an example the recently completed ball bearing plant installed by General Motors Corporation, at Sandusky, Ohio, Mr. Unwin described how the sulphuric acid pickling solution was not regarded as a waste but was used to treat the alkali cleaning and chromium plating wastes. Another feature of the plant was the use of separate tanks for collecting each type of waste and, the tank being large enough to hold 24 hours' collection of material, the whole treatment plant needed to be operated only eight hours a day.

Such systems, he said, eliminated or greatly reduced the quantity of chemicals required for conditioning the waste discharge to meet rigid State requirements as well as providing economical operation.

He also described the increasingly important problem of the disposal of the soluble and insoluble oils used as coolants and rust inhibitors in metal-working plants. In this case sulphuric acid waste was again used to treat the oil-water mixtures and bring about the required separation

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PURITY CONTROL OF STYRENE

(Continued from previous page)

The accuracy of the freezing points is also enhanced by frequently checking the apparatus and procedure with a material of known freezing point. Bromobenzene is excellent for this purpose as it is available in purity greater than 99 per cent and does not readily deteriorate. The freezing point of bromobenzene is −30.75°C. while that of pure styrene is −30.63°C.

Small Margin of Error

Sixty-eight styrene solutions containing various amounts of ethylbenzene, 4-vinylcyclohexene, and 1,3-butadiene were employed in investigating the method and in developing the empirical equation for calculating styrene purity from the two freezing points. The efficiency of separation of butadiene was judged by comparison of freezing points obtained before adding, and after removing butadiene.

These experiments indicate that variation in the amount of butadiene (up to 3 per cent) does not affect the sharpness of the separation, but it was found that a large concentration of the heavier impurities may cause a small amount of the 4-vinylcyclohexene to be pumped out during the separation and thus to be calculated as butadiene. From a consideration of the assumptions involved and the deviation of calculated from actual percentages of styrene in the prepared solutions, the probable error of the method is estimated by the Bureau at plus or minus 0.15 per cent of styrene for 90 per cent styrene solutions.

JOINT COMMITTEES PROPOSAL

LEGISLATION to make joint consultative committees compulsory in all industries was considered at a meeting of the TUC Advisory Council for non-manual workers when it met at Transport House last week. It was decided to ask the General Council of the TUC to press the Government to introduce such legislation.

The proposals were made on behalf of the Association of Supervisory Staffs Executives and Technicians by Mr. Ian Mikardo, M.P.

Home News Items

U.S. Rolling Plant for Wales.—Shipment has begun from the United Engineering and Foundry Co., Pittsburgh, U.S.A., of rolling mill equipment for a new plant at Port Talbot, Glamorgan. It will cost £4,750,000.

Colour Council Plans Tailoring Display.—The British Colour Council has been commissioned by the National Federation of Merchant Tailors to plan an exhibition of British tailoring and men's wear which will take place at Grosvenor House, Park Lane, W.1, from September 21-24. The exhibition forms part of the diamond jubilee celebrations of the federation.

Better Coal Output Maintained.—Following an improved coal output of 4,237,500 tons in the previous week, production last week again topped the four million mark with 4,274,900 tons. Of this amount 4,019,300 tons came from deep mines. Total output for the year to date is 89,361,800 tons compared with 83,519,600 in the corresponding period of the previous year.

Increased Chemical Production.—The index figures for industrial production during January and February this year, published by the Central Statistical Office, reveal a rise in the output of the chemical and allied trades. January's production index figure was 123 with a further rise to 125 in February, comparing favourably with the monthly average of 105 during 1947.

Report on Pit Disaster.—Mr. A. M. Bryan, Chief Inspector of Mines, in his official report on the explosion at William Colliery, Whitehaven, last August, states that the accident resulted from the firing of an explosive charge and that the shot hole had not been previously examined for breaks as required by the existing regulations. He recommends that the use of a break detector of approved specification and properly maintained should be made compulsory.

Aluminium Transfer. — The Aluminium Wire & Cable Co., Ltd., announces that it has transferred to its works at Swansea the London manufacturing facilities for aluminium and alloy wire and hot rolled rod previously operated by the British Aluminium Co., Ltd., and Reynolds Light Alloys, Ltd. Sales of wire and rod made at Swansea will continue temporarily to be handled by the British Aluminium Co., Ltd., but will be taken over by the Aluminium Wire & Cable Co., Ltd. soon.

More Linseed Oil Sought.—Scottish linoleum manufacturers, demanding an extra allocation of linseed oil, allege that present stocks, if released could permit a 25 per cent increase in linoleum production and allow British firms to exploit export markets.

Coal Board Scholarships.—One hundred university scholarships are to be offered this autumn by the NCB to enable boys from mining villages and public and secondary schools to qualify as mining engineers. The scholarships will be allocated equally between boys at present working in the pits and those still at school.

Road Haulage Offence.—For failing to comply with a licence condition, limiting the employment of one firm's vehicles to the carriage of goods in the Liverpool district, John Carr (Liverpool) Ltd., were fined ten guineas at Wrexham last week. The lorry was halted near Wrexham while carrying empty barrels to the Monsanto chemical works.

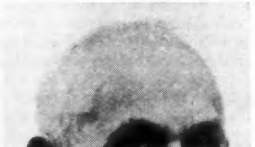
New Smelting Plant Approved.—Work on the construction of a new steel smelting shop and auxiliaries, to cost £1,722,000, at Hawarden Bridge Steel Works, has been authorised by the Ministry of Works. The scheme is part of the company's building programme by which it is expected to reduce production costs and increase output of steel sheets from about 400,000 tons to 500,000 tons a year.

Increased Solvents Prices.—Owing to rising costs in the U.S.A., Shell Chemicals, Ltd., states it has been obliged to increase the prices of certain solvents. At the 10 ton rate, methyl ethyl ketone now costs £105 per ton, an increase of £25; methyl isobutyl ketone costs £160, an increase of £32; secondary butyl alcohol £138, an increase of £38; and methyl isobutyl carbinol £154, an increase of £13.

Duty on Light Oils.—The Eire Government has increased the motor spirit tax from 9d. to 1s. 2d. per gallon. Special provision has been made to continue to exempt from the tax users of light oils for industrial purposes. A spokesman of twelve British industries, including rubber and paint, comments: "We hope that the Government will follow the example of Eire and other countries in freeing the industrial user from the duty."

PERSONAL

MR. CLEMENT SHAW, chairman and managing director of T. C. Cornwell, Ltd., proprietors of pharmacies in North Staf-



Mr. Clement Shaw

fordshire, succeeds Mrs. Jean K. Irvine, as president of the Pharmaceutical Society of Great Britain. MR. J. F. MCNEAL has been elected vice-president, and MR. SPENCER HOWELLS remains treasurer. MRS. JEAN K. IRVINE, first woman president of the Pharmaceutical Society of Great Britain, has received on retirement a replica of her badge of office from Mr. Clement Shaw. He said: "The name of Jean Kennedy Irvine will rank very, very high in pharmaceutical history. She has been an ambassador of pharmaceutical goodwill."

MR. C. E. EDWARDS has been appointed sales manager of the Appleby-Frodingham branch of the United Steel Companies, Ltd.

SIR JAMES CHADWICK, professor of physics at Liverpool University since 1935, has been pre-elected Master of Gonville and Caius College, Cambridge, and will leave Liverpool at the end of the present term.

PROF. A. W. HIXSON, executive officer of the Department of Chemical Engineering at Columbia University, has retired. His successor is PROF. T. B. DREW. Prof. Hixson has been associated with the University for 29 years, having joined the faculty after he received his Ph.D. in 1918. He has done considerable research on the chemical properties of sugars, starches, fats and proteins, and solvent properties of liquified gases. Prof. Drew, who has been associated with the Department of Chemical Engineering since 1940, was a chemical engineer with E. I. Du Pont de Nemours and Co.

MR. J. G. MUIR, secretary of Lever Bros., Port Sunlight, since June, 1947, has been appointed chief accountant of the company. He has been with the firm for 25 years.

LT.-COL. G. W. P. DAWES, D.S.O., A.F.C., who has been the FBI's district secretary at Nottingham for 19 years, has retired and has been succeeded by MR. K. J WEBB, D.S.C., who, on leaving the Navy in 1947, was appointed assistant secretary in the Cambridge office of the FBI.

MR. R. LLOYD ROBERTS, chief labour officer of Imperial Chemical Industries, has been appointed by the Minister of Labour to stimulate the development of joint production committees and similar bodies at factory level. He will assume his new duties on July 1.

MR. F. WOODIFIELD, director and works manager of the Park Gate Iron & Steel Co., Ltd., Rotherham, and president of the Iron and Steel Trades Employers' Association, sailed from England last week to attend the International Labour Conference at San Francisco as one of the advisers appointed by the British Employers' Confederation.

MR. NIELS E. RAMBUSH, of Stockton-on-Tees, managing director of Ashmore, Benson Pease & Company and the Power-Gas Corporation, is to receive an honorary science degree at Durham University on June 29. The award is in recognition of his services to local industry, particularly during the war.

Dr. W. J. Worboys, new I.C.I. director of paints, plastics and leathercloth

Technical Publications

THE extent of the debt which chemical industry owes to the refining and application to scientific uses of the rare metals cannot be assessed in terms of money, or even in terms of the number of chemical products. A means of appreciation of the numerous applications of these metals in industry is afforded by a booklet published by Johnson, Matthey & Co., Ltd., entitled "Johnson Matthey—Products and Services." In 30 illustrated pages an account is given of the company's activities in such fields as chemicals, chemical and metallurgical engineering, electronics, brazing, welding, instrument manufacture, chemical analysis and research. Of research it is observed that: "With the increasing appliion of spectrographic methods in academic and industrial research and in production control, there has arisen a need for elements or compounds of established standards of purity for use as reference standards in qualitative spectrography and in making standard mixtures containing known amounts of certain elements for quantitative work. To meet this growing demand we are now able to supply a very extensive range of standardised substances representing 68 of the chemical elements. Individual supplies of each substance are accompanied by a detailed chemical and spectrographic report."

* * *

Another publication issued by the same company—"Gold—Engineering Properties and Uses"—deals with the chemical characteristics of the metal in relation to its chemical, electrical and electronic engineering, and instrument manufacture. A special section is devoted to gold alloys, with useful notes on the effect of gold when alloyed with such metals as silver, palladium, platinum, and copper. References to the rôle of such alloys in the production of spinning jets for the manufacture of viscose rayon, requiring high anti-corrosive and mechanical properties, are particularly interesting.

* * *

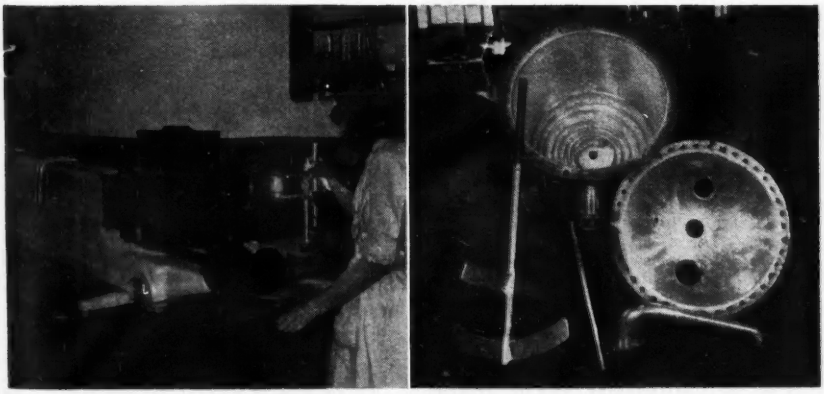
Few industries have a greater interest in the use and development of mixing machines than chemical production, and the 32-pp. illustrated brochure devoted solely to this subject now being issued by Baker Perkins, Ltd., Peterborough, contains much up-to-date information for the chemical engineer.

* * *

The Manchester Joint Research Council, which last October organised the conference on market research in which many leading executives in industry participated, has now produced a full record of the proceedings in book form ("Market Research," 2s. 6d. plus postage, the Manchester Joint Research Council, c/o the Manchester Chamber of Commerce, Ship Canal House, King Street, Manchester, 2).

* * *

The chlorination of benzol is the subject of a 4-pp. reprint now being distributed by the Glyco Products Co., Inc., of Brooklyn, N.Y., and Natrium, West Virginia. Included are a flow-sheet describing the processes for making and purifying mono-, ortho- and paradichlorobenzols and hydrochloric acids. Full details of the process and equipment are provided.



Full use is made of spectrographic analysis as one of the bases of the detailed report on the rare metals and salts supplied to chemical industry. Right: Parts of a copper still provided with a highly resistant silver lining *(Courtesy of Johnson, Matthey & Co., Ltd.)*

Ceylon's Salt Industry

From Our Own Correspondent

INCREASING demands for salt from domestic, industrial, and agricultural users in Ceylon and the greatly reduced production during the war have called for additions to manufacturing capacity. Since 1945, a number of schemes have been drawn up and tested.

The methods of manufacture are almost entirely by solar evaporation of seabrine by successive stages in enclosures of clay. An attempt was made to improve quality by evaporation of brine in deep concrete tanks, and the improvement in quality was probably worth the cost for the limited purpose for which the "brine tank salt" was chiefly used.

Large-scale manufacture of this type may result in a reduced cost. Production of boiled salt in "grainer" type pans was also attempted, though it met only with limited success owing to the unexpectedly high cost of wood fuel. A double effect vacuum evaporator was also obtained and erected.

Chief Source of Revenue

The cost price of Ceylon salt is very variable. In 1945 it was Rs.1/50 per cwt. as against 83 cents in 1939. Primary distribution is entirely a Government monopoly, and salt is sold to wholesalers at fixed prices throughout Ceylon.

The net profit derived by the Ceylon Government from the salt monopoly used to provide a very appreciable part of its annual revenue, but with the introduction of very high rates of direct taxation in recent years, the margin of profit has been reduced. There is complete protection against dumping of foreign salt in Ceylon.

The war period gave a stimulus to local production of the by-products of salterns. Import of table salt being cut off, a second quality "table salt" was manufactured. The demand for this was so gratifying that a vacuum plant was obtained for the manufacture of first-grade shaker salt. Gypsum was collected from salterns and converted into plaster of paris, and the entire demand for surgical plaster, ceramic plaster, modelling plaster, school chalk, etc., was met from this source.

Other schemes were tried out for the manufacture of hydrated magnesia, plastic magnesia, oxychloride cements and Epsom salts.

A large project has been drawn up for the production of the island's annual needs of 50,000 tons of potash salts, 1.5 million tons of salt, 100,000 tons each of gypsum and magnesia and varying amounts of iodine, boric acid, and secondary chemicals.

Indian Tariff Review

Protective Measures Accepted

RECOMMENDATIONS made by the Tariff Board to the Government of India with regard to certain chemicals and allied products form the subject of an official announcement in *The Gazette of India Extraordinary*, April 12. The Indian Government has accepted the following proposals:

STARCH: Since import prices may soon be subject to reduction, the existing revenue duty of 18 per cent *ad valorem* is to be converted into an *ad valorem* protective duty at the same rate, and remain in force until March 31, 1950.

POTASSIUM PERMANGANATE: The present revenue of 30 per cent *ad valorem* is to be converted into a protective duty at the same rate and remain in force for a period of two years up to March 31, 1949. If during the next two years the landed cost of potassium permanganate drops below Rs.156 per cwt., action will be taken by the Government to raise the duty so as to equalise the landed cost to the fair selling price estimated by the Board.

ETHER SULPHURIC P.B. AND ANAESTHETIC: The Government of India is to convene a conference of representatives of Provincial and State Governments to suggest:

(*a*) ways and means of ensuring that alcohol, an important raw material, is supplied to the different factories in India at a uniform price;

(*b*) suitable reduction in freight on alcohol; and

(*c*) modification of the provincial excise rules in the interests of the industry.

BBC Science Appointments

THE BBC announces that it has appointed a Scientific Advisory Committee whose terms of reference are to advise on the BBC's scientific research and its correlation with external activities in the same field. The following have accepted invitations to serve on the committee:—

SIR EDWARD APPLETON, secretary DSIR, chairman; SIR JOHN COCKROFT, director, Atomic Energy Research Establishment, vice-chairman. Other members: DR. H. G. BOOKER, Christ's College, Cambridge; PROF. WILLIS JACKSON, Imperial College of Science and Technology; DR. R. L. SMITH-ROSE, DSIR, and PROF. F. C. WILLIAMS, electrochemical laboratory, Manchester University.

Poland's Natural Gas Deposits.—Considerable deposits of natural gas are reported to have been discovered in the Rzeszow region of Poland as well as near Cracow and Lodz.

Overseas News Items

Paper from Straw.—A report from Ontario last week, stated that the Ontario Paper Company's plant had produced 50 tons of newsprint, the first to be manufactured partly from straw.

Oil Search in Philippines.—Lacking the necessary funds to undertake the work, the Philippine Government has decided to allow foreign private oil companies to search for oil in the Commonwealth.

Brazilian Chemical Imports.—Amounting to 4.5 per cent of total imports in 1947, Brazil's imports of chemicals and pharmaceutical and medicinal products were valued at $48,888,000. This compares with a total of $29,653,000 (4.3 per cent of total imports) in 1946.

Pipe Line Oxygen for Du Pont.—Nine milion cu. ft. of oxygen per day will ultimately be piped from a new producing unit to be built and operated by the Linde Air Products Company, U.S.A., to the Du Pont plant at Belle, West Virginia. Construction is expected to be completed early next year.

Radioactive Protection Claimed.—Greek scientists have claimed to have discovered a material protective against radioactive emissions. One of them, a chemist, named Vatikiotis, said the material could be used for uniforms or as house protection. It would be used in conjunction with a cyclotron.

New Venezuelan Oil Refinery.—According to the Petroleum Press Bureau a new oil refinery with a capacity of 25,000 barrels per day is to be erected in Maracaibo, Venezuela, under a contract signed between the Venezuelan Government and the Richmond Exploration Company, a subsidiary of the Standard Oil Company of California.

U.S. Fuller's Earth Production.—According to the U.S. Bureau of Mines, output of fuller's earth in the U.S.A. last year totalled 329,068 short tons, an increase of 10 per cent over 1946 and only 2 per cent less than the record output of 335,644 tons in 1930. The mineral oil refining industry consumed more than half of last year's production.

Malayan Rubber Imports.—Imports of dry rubber into the Malayan Union in April last amounted to 18,228 tons, states the Malayan Government in London. The chief sources were Sumatra, 9501 tons; Dutch Borneo, 1530 tons; Java and other Dutch Islands, 2383 tons; Sarawak, 2988 tons; North Borneo, 1049 tons; Burma, 376 tons and Siam, 240 tons. Total wet rubber imports amounted to 5514 tons (dry weight).

Poland Developing Zinc Ore Deposits.—Favourable results are reported to have been obtained from zinc prospecting activities in Central Poland and it is proposed to erect smelting plant at Boleslaw.

U.S. Synthetic Oil Research.—The Mellon Institute in Pittsburgh is undertaking research on behalf of the Gulf Oil Corporation, relating to the scientific basis of the Fischer-Tropsch process and improvements in oil synthesis.

Australian Bitumen Refinery Opened.—The first bitumen refinery in Australia was opened recently at Clyde, N.S.W. The plant, which is owned by the Shell group, is designed to produce about 35,000 tons of finished bitumen products a year from imported materials.

Naturally Coloured Cotton.—Cotton plants in Egypt are stated to have been successfully injected with chemicals to produce coloration in the fully grown bolls. Three or four varieties have been produced on a small scale, and seeds from the treated plants are said to perpetuate the colour.

New Silk Factory in Argentina.—Backed with £3 million capital a new artifical silk factory is to be erected in Argentina. Utilising raw material from home sources, the factory may possibly, when full production is reached supply the whole of the country's domestic requirements.

U.S. Nitrogen Shipments.—The U.S.A. is unlikely to ship more than 61,000 tons of nitrogen for agricultural requirements in the 1948-49 season, according to a statement made by the Assistant Secretary of Agriculture. This quantity will have to cover needs of the 16 Marshall-Plan countries as well as of China, India, the Philippines and Canada.

African Mining Development.—The Newmont Mining Corporation, a Canadian company, has formed a subsidiary which is to exploit copper, lead and zinc ores in the former German-owned Tsumeb mine in S.W. Africa. Present plans are to install a 1000-ton mill to produce a 50 per cent lead and 15 per cent copper concentrate.

X-ray Equipment for Argentina.—One of the largest consignments of X-ray equipment exported from the U.K. was despatched from the Port of London recently. Bound for Buenos Aires, this equipment, made by Philips Electrical, Ltd., is worth £20,000 and consists of six heavy duty diagnostic units, and six motor-driven tilting couches, as well as the latest form of ultra short-wave electro-medical treatment equipment.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ACE PRODUCTS (MANCHESTER), LTD. Wilmslow, chemical manufacturers, etc. (M.12/6/48). May 1, deb., to Mosley Street Nominees Ltd., securing all moneys due or to become due to Williams Deacon's Bank Ltd., general charge. *Nil. June 10, 1947.

ALEXANDER RUSH, LTD. Stockport, chemical manufacturers. (M.12/6/48). May 6, £4000 charge, to City of Liverpool; charged on land at Kirkby Trading Estate, Kirkby, together with buildings and erections known as 8C18, 8C18A and 8C18B with fixed factory plant and fixtures thereon. *Nil. May, 18, 1946.

DUALLOYS, LTD. (formerly DUALLOYS (1947), LTD), Chard, dealers in metals. (M.12/6/48). May 4, charge, to J. W. Warrington, London, and ano. securing all advances made by the chargees as guarantors under a mortgage dated March 9, 1948; charged on Boden Works, Boden Street, Chard.

INDUSTRIAL COLLOIDS, LTD. Altrincham, chemical manufacturers, etc. (M.12/6/48). May 6, by order on terms, deb., to Lloyds Bank Ltd., securing all moneys due or to become due to the Bank; charged on land at Broadheath, with works, offices and buildings thereon, plant, fixtures, etc., and a general charge. *Nil. September 3, 1947.

New Companies Registered

Ridonik, Ltd. (454,420).—Private company. Capital £100. Manufacturers of chemicals, gases, drugs, medicines, etc. Directors: W. T. Norman and J. I. Robertson. Reg. office: 39 Cheapside, E.C.2.

Mentor Products, Ltd. (454,907).—Private company. Capital £100. Manufacturers of pharmaceutical, laboratory, chemical, industrial and other preparations, etc. Directors: K. L. Martin, 8 Palowell Park, S.W., and Mrs. Ann Martin.

Charlton Sinclair (U.K.), Ltd. (454,875). Private company. Capital £200. Manufacturers of pharmaceutical, chemical, industrial and other preparations, etc. Secretary: Eileen R. Pinnel. Reg. office: 22 Charing Cross Road, C.2.

T. C. Industrial Chemical Co., Ltd. (454,802).—Private company. Capital £5000. Manufacturing chemists, manufacturers of oils, lubricants, greases, dyes, colours, paints, etc. Directors: F. H. Baggaley, C. F. R. Lowe, and A. G. Lowe. Reg. office: 30 Cawte Road, Southampton.

Henry W. Peabody (Industrial), Ltd. (454,706).—Private company. Capital £100. Manufacturers, importers and exporters of all kinds of detergents, oils, oleaginous and saponaceous substances and chemical preparations, etc. Directors: R. A. G. Tilney, C. H. Benmore, N. F. Tingle and A. F. Robertson. Reg. office: 16 Eastcheap, E.C.3.

Company News

British Paints (Holdings), Ltd., which controls a group of manufacturing businesses in the U.K., and one each in India and Australia, is issuing 700,000 4½ per cent cumulative preference £1 shares at 21s.

One of the leading Italian metallurgical companies, **Società Italiana Metallurgica**, which specialises in non-ferrous metals, notably copper, has declared a net profit of 36.2 million lire (against 8.9 million in 1947). Capital has been increased from 90 million to 270 million lire. Nearly 34 per cent of output was exported.

Chemical and Allied Stocks and Shares

As was to be expected, the serious position that would result from the threatened "cut" in Marshall Aid has been the factor dominating stock markets. Industrial shares were marked down sharply by jobbers as a precautionary measure, and this prevented any heavy selling. On the other hand, the lower prices attracted very little buying, and the general impression is that buyers are awaiting full terms of the Imperial Chemical issue. It has now been officially announced that this is to be on the basis of one new share for every five held. This would mean the issue of over 10 million new shares which, however, would be less than half earlier market estimates. Meanwhile, main attention centres on the

price of issue, which will of course have to be determined by market conditions and their outlook. At the time of writing the general belief is that the issue price will be at least 40s., and following their earlier decline the old shares seem to have steadied around 47s.

Laporte Chemicals 5s. ordinary changed hands around 20s. 6d., Monsanto Chemicals 5s. shares were 58s. 9d., Amber Chemical 2s. shares were 10s. 4½d., and Albright & Wilson 5s. ordinary 30s. 6d. Business around 58s. was recorded in Fisons, and in other directions, W. J. Bush new 5 per cent preference marked 26s. 6d. Elsewhere, Cooper McDougall & Robertson were dealt in at 40s. and better demand continued for William Blythe 3s. shares, quoted at 19s.

Dunlop Rubber have come back to 70s. 3d. with the prevailing market trend, United Molasses were down to 48s. 6d., Turner & Newall 75s., British Aluminium 50s., British Match 40s., Amalgamated Metal only 20s. 1½d., while British Glues & Chemicals 4s. shares receded to 20s. 9d. Despite the maintained dividend, De La Rue eased to 43s. 9d., and shares of companies connected with plastics mostly moved lower, British Industrial Plastics 2s. shares being 6s. 9d., and British Xylonite £5¼.

Lever & Unilever were back to 50s., General Refractories 23s. 1½d., British Oxygen £5 and International Combustion 42s. 6d., Babcock & Wilcox were down to 69s. 9d., and iron and steel shares generally lost ground, although in most cases declines on balance have not exceeded more than a few pence at the time of writing. Colvilles were 33s. 10½d., with Guest Keen 47s. 6d., Dorman Long 29s. 9d., Stewarts & Lloyds 54s. 10½d., and United Steel 28s. 9d. Nevertheless, the excellent steel production figures are creating a good impression, and give confidence that, in many cases, profits this year must reflect higher output. It is a pity therefore from the point of view of shareholders that the dividend proviso means that dividends will generally be kept at last year's levels.

Boots Drug have fallen sharply to 49s. 6d., reflecting the set-back which has affected all shares of companies with large retailing interests. The market has apparently been affected by the report that to-date the coupon cuts and lower prices of many goods have not led to an increase in turnover. Shares of companies with proprietary medicine interests were also again out of favour, Beechams deferred receding to 18s. 9d., with Aspro 38s. 6d., Griffiths Hughes 35s. In other directions, Sangers were steady at 34s. although Timothy Whites eased to 39s. following publication of the results. Glaxo Laboratories have fallen to £16½ with the general trend of markets. Oil shares attracted considerable attention in view of the big profit increases announced by leading companies, which reflect increased output and the sale of a larger proportion on a dollar basis. Nevertheless, despite the excellent results, Anglo-Iranian have come back to £8½, and Shell to 78s. 10½d. owing to prevailing market conditions.

British Chemical Prices

Market Reports

THERE has been no slackening of interest in the industrial chemicals market and delivery specifications in most departments are reported as being fully up to the contract schedules. New business has been on a moderate scale, with export inquiry well sustained. Supply difficulties remain the chief concern of traders, particularly in the export field and much of this business is in circulation awaiting actual bookings. The price position shows no outstanding alterations and the undertone of the market is firm. The coal-tar products market is also without feature, with all available supplies finding a ready outlet. A slight increase in the price obtaining for American duty-free cresylic acid is understood to be coming into operation.

MANCHESTER.—New inquiry and additional bookings have been plentiful in many sections of the Manchester chemical market during the week. A wide range of textile chemicals are being called for in substantial quantities by the cotton, woollen and other branches, and in some instances it is still not easy fully to cover requirements. From other industrial outlets for chemicals a steady demand is reported in most cases. The soda and potash chemicals and the mineral acids are all finding ready outlets, and prices generally are well held. In the tar products market a brisk call for deliveries of most descriptions is reported.

GLASGOW.—There has been a slight improvement in the turnover in the chemical market during the week and there are signs that buying is likely to be less depressed than it has been of late. There has been a heavier demand for coal tar products which, up to the present, has been fairly well met. The recent dry weather resulted in a heavy demand for DDT preparations from the farming community. In the export market, conditions are more or less normal. A number of orders which might have been secured have unfortunately not been booked, due to the inability of importers to obtain import licences. This has applied particularly to Sweden.

DUTCH CHEMICAL INDUSTRY

SALT production by the Koninklijke Nederlandsche Zoutindustrie, which is practically Holland's sole manufacturer of this commodity, amounted to 240,579 metric tons in 1947. More than half this quantity was exported at prices much higher than those in the home market. Output of chemical products derived from salt reached a new high level, but only a relatively small proportion could be allocated for domestic needs.

In the plastics field, the Internationale Kunststoffen Industrie of Voorschoten reports that orders are being received at such a rate as to make it imperative that new equipment be installed as soon as possible. The company hopes soon to draw its basic materials from the new factory of the Bataafsche Petroleum (Royal Dutch) of Pernis and attempts are being made to secure capital in order to speed up developments. So far, investors have responded satisfactorily, despite the prevailing mood of caution at the Amsterdam Exchange.

Two of the most important superphosphate concerns, Vereenigde Chemische Fabrieken and Amsterdamsche Superfosfaatfabriek, report that exports of superphosphates from Holland have had to be reduced in order to meet home needs, but the pre-war level of output has now been reached and may alleviate the position. According to official estimates, Holland needs about 130,000 tons of nitrogen and potash fertilisers this season. Her own output amounts to approximately 70,000 tons, and due to the prevalent world shortage it is hardly likely that the deficit will be made up by imports. It is believed in trade circles that the present serious position may lead to the introduction of a ration system for fertilisers.

NEXT WEEK'S EVENTS

WEDNESDAY, JUNE 16

Midland Chemists' Committee. University, Edmund Street, Birmingham, 6.30 p.m. E. T. Osborne: "The Chemist as a Government Inspector."

WEDNESDAY, JUNE 16 to SATURDAY, JUNE 19

Illuminating Engineering Society. Harrogate. Summer Meeting. N. L. Harris: "New Lamp Developments"; Dr. W. E. Harper and Mr. Walker: "The Application of Acrylic Plastics to Lighting Equipment."

THURSDAY, JUNE 17

The Royal Society. Albemarle Street, W.1, 2.30 p.m. Sir Paul Fildes: "Analogues of Growth Factors in Relation to Antibiotics." (Discussion).

FOREIGN CHEMICAL RESULTS

La Compagnie des Produits Chimiques et Electro-Métallurgique Alais, Froges et Camargue, reports a net profit for 1947 of Fr. 165.8 million. A dividend of Fr. 30 was declared on the old shares and the new free shares, while a rate of Fr. 9.52 was declared on newly introduced shares. *Société d'Exploitations et d'Interets Chimiques et Métallurgiques*, the company's chief subsidiary, reports a net profit of Fr. 57.4 million. A dividend of Fr. 30 has been declared on the shares, while the profit-participating certificates received Fr 32.64.

Durand and Huguenin, A.G., Basle, manufacturers of chemicals and dyestuffs, is to recommend at the annual general meeting on May 21 a dividend of 18 per cent; last year's payment was 16 per cent.

"*Arbed*," the important Luxembourg steel company, reports that production of crude steel rose from 813,661 tons in 1946 to 1,228,553 tons last year, while output of rolled products increased from 649,729 tons to 994,367 tons. Although these figures show considerable progress, they are, nevertheless, about 50 per cent below the corresponding pre-war level. The gap between the cost of making steel in Luxembourg and in other steel producing countries has been increased. Transport costs have also risen steeply, and are now said to be two to three times higher than in Belgium. Net profit totalled Fr. 105.3 million, and a dividend of Fr. 333 declared.

TEXTILE HONOURS

THE following honours are announced by the Textile Institute:—

Fellows: MR. HERBERT FULLARD, branch president last year of the Textile Teachers' Association; MR. WILLIAM WHITEHEAD (Celanese Corporation of America).

Associates: MR. WILLIAM ARMFIELD (research and analytical chemist, Courtaulds, Ltd.) MR. GEOFFREY W. BROWNE (superintendent, British Celanese, Ltd., Wrexham, and last year's vice-chairman of the Council of British Association of Chemists); MR. HAROLD HOLDEN (David Whitehead & Sons, Ltd.); MR. WILFRED BOWDEN (head of the training school, Ashton Bros. & Co., Ltd., Hyde); MR. HERBERT W. PARTRIDGE (chief chemist, Stevensons (Dyers), Ltd., Derby); MR. WILLIAM RAYMOND SEDDON (industrial consultant, Urwick, Orr & Partners, Ltd., London); MR. SIMON BARBER, (Fibreglass, Ltd., St. Helens); and MR. GEORGE WILLIAM LEWIS (assistant dyer, Brintons, Ltd., Kidderminster).

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Manufacture of 5-hydroxy-methyl 2-furfural.—W. N. Haworth and L. F. Wiggins. Oct. 17, 1945. 600,871.

Chlorinated rubber adhesives.—Firestone Tire & Rubber Co. Sept. 20, 1944. 600,988.

Treatment of chlorinated rubber derivative.—Firestone Tire & Rubber Co. Sept. 20, 1944. 690,989.

Chlorination processes.—Ridbo Laboratores, Inc. Jan. 18, 1945. 600,993.

Manufacture of acylated aliphatic amino carboxylic acid amides.—J. R. Geigy, Akt.-Ges., and R. M. Hughes. Dec. 6, 1945. (Addition to 586,135.) 600,893.

Process for the lamination of plastic sheet material.—E. I. Du Pont de Nemours & Co. and E. A. Bingeu. April 21, 1944. (Divided out of 586,028.) 601,050

Production of vinyl halide resins.—Distillers Co., Ltd., J. J. P. Staudinger and B. K. Kelly. May 20, 1943. (Divided out of 600,904.) 600,950.

Casting of non-ferrous metals.—J. W. Penicud. Jan. 16, 1939. 601,250.

Production of branched chain alkenes.—Anglo-Iranian Oil Co., Ltd., and E. W. M. Fawcett. Jan. 10, 1941. (Cognate Application 3264/41.) 601,202.

Synthetic resins.—T. Urbanski. June 5, 1942. 601,101.

Process for the preparation of esters of fluorophosphonic acids and chlorophosphonic esters.—H. McCombie, B. C. Saunders and C. L. Wheeler. Sept. 15, 1943. 601,210.

Manufacture of alpha-chloroacrolein.—Distillers Co., Ltd., and K. H. W. Tuerck. Nov. 19, 1943. 601,211.

Separation of wax from crude wax fractions obtained from petroleum distillates.—Steel Bros. & Co., Ltd., A. D. Armstrong, J. Mitchell, A. M. Fraser and W. H. Chulmers. June 25, 1944. 601,212.

Polymerisation of butadiene -1, 3 hydrocarbons and the polymerisation of mixtures of copolymerisable unsaturated organic compounds, at least one of which is a butadiene -1,3 hydrocarbons in aqueous emulsion.—B. F. Goodrich Co. Sept. 8, 1943. 601,223.

Aluminothermic processes for the production of manganese and ferro-manganese from managanese ore.—E. Lux. Oct. 26, 1944. 601,113.

Chlorinated products of carboxylic acid esters.—Ridbo Laboratories, Inc. Aug. 19, 1943. 601,114.

Manufacture of hydrocarbon copolymers.—J. C. Arnold (Standard Oil Development Co.). Nov. 14, 1944. 601,224.

Manufacture of polymeric materials and employment thereof.—J. C. Arnold (Standard Oil Development Co.). Nov. 27, 1944. 601,226.

Production of synthetic linear condensation polymers.—J. Lincoln. March 16, 1945. 601,123.

Apparatus for the detection and measurement of knock in internal-combustion engines.—Anglo-Saxon Petroleum Co., Ltd., P. G. Pigueguy and D. M. Clement. April 24, 1945. 601,234.

Process for separating, according to specific gravity, of mixtures of solid materials, the particles of which differ mutually in size and specific gravity, especially of coal-containing mixtures. — De Directie Van de Staatsmijnen in Limburg. April 7, 1943. 601,166.

Polymerisation products, particularly for use as lubricating oil additives.—C. Arnold (Standard Oil Development Co.). June 18, 1945. 601,258.

Manufacture of polyazo-dyestuffs.—Ciba, Ltd. Aug. 9, 1944. 601,266.

Processes of purifying crude metal phytates.—Corn Products Refining Co. May 2, 1945. 601,273.

Preparation of mono-substituted iso-melamines.—American Cyanamid Co. Sept. 14, 1944. 601,075.

Manufacture of vinyl cyanide.—Imperial Chemical Industries, Ltd. Sept. 27, 1944. 601,076.

Preparation of alkyl acylaminocyano-acetates.—Winthrop Chemical Co., Inc. Dec. 19, 1944. 601,184.

Automatic controls for gas-turbines.—Bristol Aeroplane Co., Ltd., and P. Fortescue. Oct. 16, 1945. 601,137.

Polymerisation of vinyl acetate in emulsion.—Distillers Co., Ltd., D. Cleverdon and J. J. P. Staudinger. Oct. 30, 1945. 601,191.

Catalytic purification of coal gas or other combustible gases.—H. Balfour & Co., Ltd., W. L. Burns and A. C. Bureau. Oct. 30, 1945. 601,094.

Condensation pumps.—Distillation Products, Inc. Nov. 4, 1944. 601,284.

Cellulose bleaching.—Hercules Powder Co. Sept. 28, 1942. 601,290.

Coagulation of emulsion polymers.—Wingfoot Corporation Aug. 23, 1945. 601,293.

Generation and control of oxygen.—T. L. Clayton, H. L. Bolton, E. Q. Laws and J. Buckingham. Nov. 23, 1945. 601,295.

Production of amino-acids and intermediates therefor.—J. Lincoln. Dec. 18, 1945. 601,142.

Manufacture of piezo-electric crystals.—General Electric Co., Ltd., N. A. Wooster, W. A. Wooster, J. L. Rycroft, L. A. Thomas and E. A. Fielding. Jan. 23, 1946. (Addition to 580,965.) 601,243.

Condensing zinc vapour.—New Jersey Zinc Co. Nov. 3, 1945. 601,246.

Internally cooled zinc condenser.—New Jersey Zinc Co. Dec. 5, 1945. 601,247.

Zinc smelting.—New Jersey Zinc Co. Jan. 17, 1946. 601,248.

Manufacture of ethers and esters of polysaccharides.—W. A. N.V. Scholten's Chemische Fabrieken. Jan. 23, 1940. 601,374.

Lubricating oil compositions.—American Cyanamid Co. April 17, 1942. (Cognate Application 8428/43.) 601,586.

Process for the manufacture of rubber-like polymeric materials.—Standard Oil Development Co. Aug. 14, 1942. 601,587.

Monofilament synthetic yarns, strands or strips and fabrics woven therefrom.—A. H. Stevens (Firestone Tire & Rubber Co.). Dec. 28, 1943. 601,305.

Method of protecting metals and their alloys during heat treating and fabricating operations.—Oneida, Ltd. June 25, 1943. 601,591.

Method of treating carbon or graphitised carbon bodies.—Westinghouse Electric International Co. Feb. 8, 1943. 601,377.

Mixed aldehyde condensation products and processes of producing same.—American Cyanamid Co. July 8, 1943. 601,308.

Halogenation of organic fluorine compounds.—Imperial Chemical Industries, Ltd. Nov. 9, 1943. 601,596.

Manufacture of sulphonamide compounds.—Boots Pure Drug Co., Ltd., W. F. Short and R. P. Hullin. Jan. 11, 1945. 601,450.

Vinyl resin suspensions.—Carbide & Carbon Chemical Corporation. March 3, 1944. 601,452.

Organic thiocyano-cyclic compounds.—A. P. H. Dupire. July 27, 1943. 601,454.

Process for the preparation of acid alkyl sulphates and of salts of these acids.—Soc. D'Innovations Chimiques. Nov. 18, 1943. 601,602.

Fungicide and bactericide.—Shell Development Co. March 27, 1944. 601,456.

Production of polyoxypropylene compounds.—Carbide & Carbon Chemicals Corporation. May 30, 1944. 601,604.

Methods of packaging liquid chemical substances.—R. Adler and S. Stern. April 15, 1944. 601,606.

Production of magnesium and magnesium base alloy sections and sheets.—Magnesium Elektron, Ltd., and A. B. Lisle. May 18, 1945. (Cognate Application 14946/46.) 601,399.

Process for contacting solid particles with gaseous fluids.—J. C. Arnold (Standard Oil Development Co.). May 28, 1945. 601,389.

Process for the production of rubber-like copolymers.—J. C. Arnold (Standard Oil Development Co.). May 29, 1945. 601,317.

Process for the preparation of amino-derivatives of dioxa-cyclopentane and quaternary salts derived therefrom.—Soc. Des. Usines Chimiques Rhone-Poulenc. March 8, 1944. 601,612.

Emulsion polymerisation. — C. Arnold (Standard Oil Development Co.). June 20, 1945. 601,390.

Production of arylaliphatic diamines.—Soc. Des. Usines Chimiques Rhone-Poulenc. March 7, 1944. 601,615.

Process for the purification of fuel gases.—Gas Light & Coke Co., R. H. Griffith and J. H. G. Plant. Aug. 22, 1945. 601,320.

Treatment of cyclic acetals for the production of glycols.—C. Arnold (Standard Oil Development Co.). Aug. 23, 1945. 601,472.

Acid removal or anion exchange processes for the treatment of water or other liquids.—Permutit Co., Ltd., R. T. Pemberton and E. L. Holmes. Aug. 24, 1945. 601,321.

Composition and preparation of catalyst masses. — Magnesium Metal Corporation, Ltd., and A. G. Carter. Aug. 28, 1945. 601,535.

Processes of producing a dicarboxylic acid derivative of a sulphathiazole.—Monsanto Chemical Co. Sept. 10, 1942. 601,624.

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